

# ***Solaria 650/Solaria 650C Technical Reference Manual***



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## **Preface**

### ***Notice***

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### **About this manual**

This service manual explains basic procedure of maintenance and disassembly of Solaria 650. This manual is written for technicians who have been trained in basic electronic repairing and testing.

For better technical support, we will keep you update on technical information through the web site: [www.gosignal.com](http://www.gosignal.com) which including the latest drivers download, FAQ, technical service and so on. If you have any opinion about our product, please email to: [support@gosignal.com](mailto:support@gosignal.com)

SiGNAL welcome 's your comments, if you need latest information, please don't hesitate to contact us anytime.



## **Related Documentation**

<b><u>Read Me First! Solaria 650</u></b>	Release notes for the version of Solaris™ currently offered for Solaria 650.
<b><u>Solaria 650 User Manual</u></b>	Describes how to use Solaria 650 Notebook Workstation.



## **Chapter 1 General System Description**



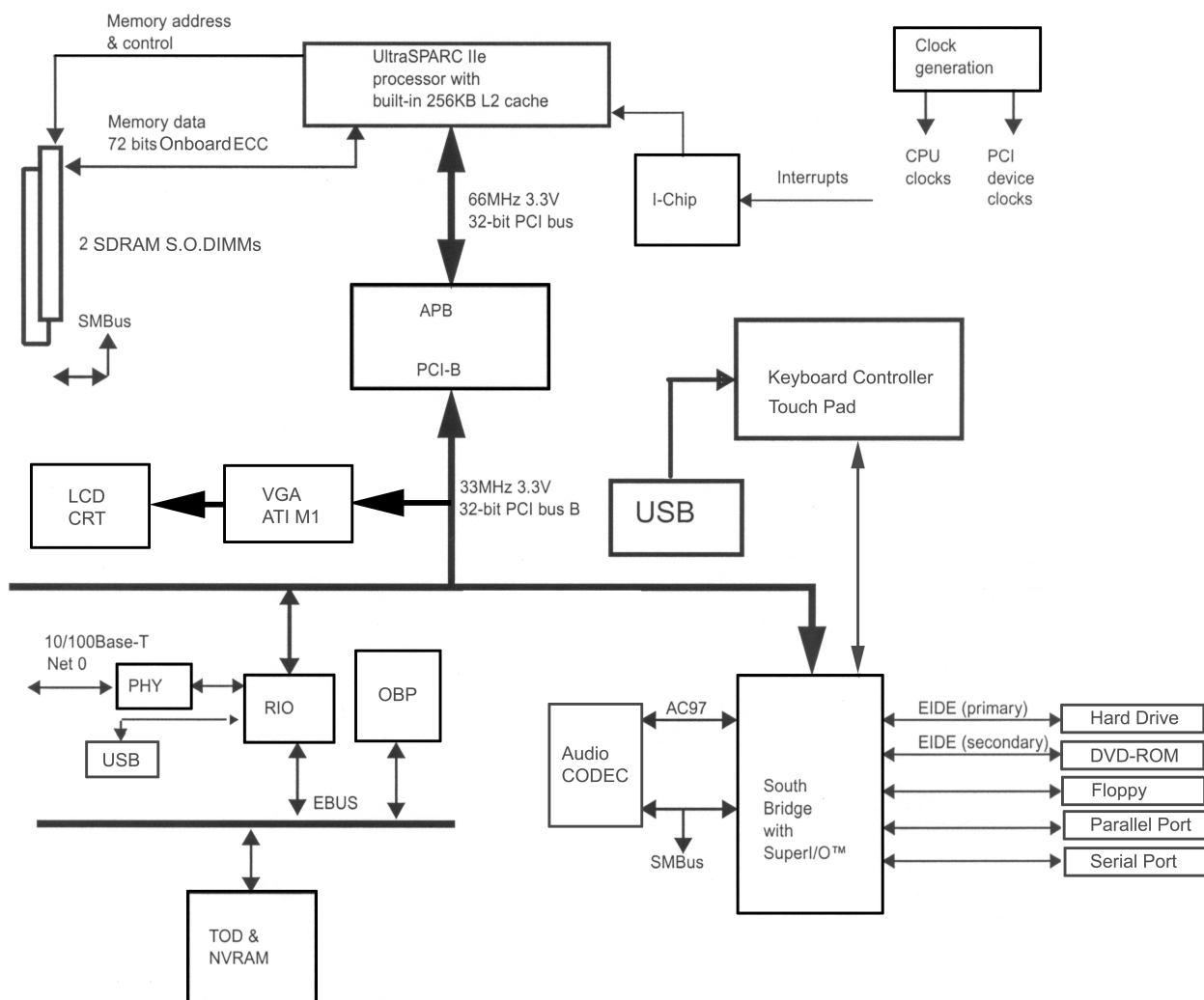
*System Features*  
*System Block Diagram*  
*Specifications*  
*Identifying External Components*

## **1.1 System Features**

- All-in-one design
- Supports up to 1GB of main memory
- Power by 64-bit Sun™ UltraSPARC III 650MHz CPU with a 256KB L2 cache
- Built-in 15-inch TFT SXGA+ LCD Panel (Solaria 650) supports resolution up to 1400x1050x60 24-bit color depth
- On Board 2-D graphics to provide 24-bit color depth
- Pre-boot personal ID Security system (800K combination)
- Magnesium-Alloy Casing
- UPS System: Long Battery Life
- Pre-installed Solaris™ 8 Operating Environment Provides binary compatibility with previous Solaris version as well as workstation & server
- Built-in 5.25" high speed slim type DVD-ROM or Combo drive (Optional)
- Built-in audio chip to provide multimedia feature
- Two 144-pin memory sockets for SDRAM S.O.DIMMs
  - Buffered memory support
  - Supports up to 2GBytes of memory
  - Supports any combination of 256/512 MB/1024MB memory S.O.DIMM
- EIDE bus that can supports ATA66 EIDE devices
- Floppy disk drive support
- One 10/100Base-T Fast Ethernet port with fully buffered transmit and receive channels
- One asynchronous serial port on the rear I/O panel
- Two (Type A connector) USB ports, operating independently to provide maximum throughput
- Centronics compatible parallel port interface, IEEE-1284 compliant bi-directional parallel port
- OBP flash PROM that contains boot-up and self-test code for OpenBoot PROM program (OBP) and POST (Power-On Self-Tests)
- NVRAM that stores system parameters in non-volatile memory and also provides time-of-day (TOD) clock
- Optional Personality Module:
  - 2<sup>nd</sup> Battery pack allows to extend your battery life
  - 2<sup>nd</sup> hard drive holder allows to expand your hard drive capacity



## 1.2 System Block Diagram



## 1.3 Specifications

<b>Processor</b>	UltraSPARC Ili 650 MHz 256-KB L2 External Cache	
<b>Memory</b>	2GB maximum, buffered type / error correction SDRAM <b>Note: The RAM Modules are proprietary.</b>	
<b>Memory Configuration</b>	256MB configuration includes one 256MB SODIMM 512MB configuration includes two 256MB SODIMM 768MB configuration includes one 256MB and one 512MB 1GB configuration includes two 512MB SODIMM 2GB configuration includes two 1024MB SODIMM	
<b>Display</b>	15.0 " TFT SXGA+ LCD Panel Supported (Solaria 650)	
<b>Graphics</b>	On-board 24-bit 2-D/3-D Graphics accelerator 8MB of SGRAM for high resolution 2-D Graphics	
<b>Standard Interfaces</b>	Network	Ethernet/Fast Ethernet, Twisted pair standard (10-BaseT and 100-BaseT) self-sensing
	Serial	One D-Sub 9-pin connector, asynchronous
	Parallel	One D-Sub 25-pin connector, IEEE 1294 (bi-directional)
	Audio	Two Powerful Stereo Speakers built-in, two audio ports: Line-out Jack & Microphone-in Jack
	USB CRT	Two USB (Type A) connectors One D-Sub 15-pin VGA connector
<b>STORAGE &amp; MEDIA</b>	Internal disk	2.5", 20-GB, ATA66 Hard Disk (Default)
	Internal Media	8X DVD-ROM (Default), Combo CD-RW/DVD-ROM (Optional)
	Internal Floppy Disk Module	One 3.5-in., 1.44-MB floppy
	Expansion	2 <sup>nd</sup> Hard Disk Module (Swappable with Floppy Module)
<b>Security</b>	Built-in H/W Security Controller 4 button input providing up to 800k possible combination	
<b>Input Device</b>	Touch Pad (Two Buttons) Full Functions Keyboard (W / <u>System Hot-Keys</u> & <u>Sun's Function Keys</u> )	
<b>Operating System</b>	Solaris™ 8 Operating Environment (04/01) (Pre-installed)	
<b>Battery</b>	Li-ion Smart Battery Pack 2 <sup>nd</sup> Battery Supported (Swappable with Floppy Drive Module)	
<b>System Status</b>	LEDs	

<b>Indicator</b>		
<b>Environment</b>	AC Adapter	100-240 VAC, 50-60 Hz, Output: 15V, 4A
	Operating	5? to 35? (41? to 95? ) 20% to 80% relative humidity, non-condensing
	Non-operating	-40? to 60? (-4? to 140? ) 5% to 95% relative humidity, non-condensing
<b>Regulations</b>	Meets or exceeds the following requirements:	
	Safety	UL 1950, CSA C22.2 No. 950, TUV EN 60950, CB Scheme with Nordic deviations EMKO-TSE (74-SEC) 203, ZH1/618
	RFI/EMI	FCC Class B, DOC Class B, EN 61000-3-2 EN 55022 Class B, EN 61000-3-2
	Immunity	EN 50082-1
	X-ray	DHHS 21 Subchapter J; PTB German x-ray Decree
	Power Management	Energy Star compliant
<b>Dimension</b>	322(W) x 273(D) x 41(H) mm / 12.6" x 10.7" x 1.6"	
<b>Weight</b>	3.1 kg / 6.8 lbs	

### 1.3.1 Processor

The Solaria 650 uses an UltraSPARC Ili 650MHz CPU with a 256KB L2 cache in a 370-pin PGC package. UltraSPARC Ili is a highly integrated 64-bit RISC processor compliant with the SPARC V9 architecture. Integrated on-chip is a Level 2 Cache, a PCI bus controller and a Memory Management Unit (MMU) with synchronous DRAM interface.

#### CPU Architecture Features

- Configurable Clock Generator
- Vectored Interrupt Controller (I-Chip)
- Configurable Core Voltage Regulator
- 64-bit SPARC V9 architecture
- Four-way super-scalar pipeline
- 256KB level-2 cache support
- 32-bit, 66 MHz PCI bus
- Integrated memory controller
- Low-cost industry standard package
- TOD (time of day) clock and NVRAM (non-volatile random access memory) with built-in battery

### **1.3.2 Memory**

---

256MB/512MB memory S.O.DIMMs can be used in any combination.

- Two 144-pin S.O.DIMM sockets to support PC133MHz SDRAM S.O.DIMMs
- 1 GB addressable memory space using two 512 MB SDRAM S.O.DIMM
- Memory data bus width: 64 bit data, 8 bit ECC

#### **1.3.2.1 Error Detection & Correction**

The memory architecture supports Error Checking and Correction (ECC).

UltraSPARC III generates ECC bits during SDRAM write cycles and checks the ECC bits during read cycles. Detected errors result in an access error trap.

- A single bit error is detectable and correctable (CE).
- Errors in two bits are detectable but not correctable (UE).
- Errors in more than two bits may go undetected.

#### **1.3.2.1 Signal Presence Detect**

The SDRAM S.O.DIMM Modules implement the Signal Presence Detect (SPD) mechanism as specified in the PC133 SDRAM SPD Specification. A serial EEPROM on the S.O.DIMM module contains data programmed by the S.O.DIMM manufacturers that identifies the module type and SDRAM parameters.

### **1.3.3 PCI Bus Interface**

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The UltraSPARC III provides a 32-bit 66 MHz PCI interface. The Solaria 650 design allows it to connect directly to an Advanced PCI Bridge (APB).

### **1.3.4 Advance PCI Bridge (APB)**

---

The APB is a Sun proprietary 272-pin PBGA ASIC which concentrates two secondary

33 MHz PCI buses onto a primary 66 MHz PCI bus. The APB is a die-shrink version of the earlier version.

- PCI Local Bus Specification Revision 2.1 compliant
- PCI Bridge Specification revision 1.0 compliant
- 32-bit memory addressing for PIO and DMA
- 72-byte buffering FIFO for DMA and PIO paths

- Full concurrency for primary and secondary PCI buses
- Independent bus arbitration for 4 devices on each secondary bus

### **1.3.5 Display**

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The Solaria 650 uses ATI RAGE Mobility for display adaptor; the general features are list below.

- High integration results in a low cost and small footprint single component graphics subsystem, ideal for full range of notebook designs.
- PCI version 2.1 with full bus mastering and scatter/gather support.
- Bi-endian support for compliance on a variety of processor platforms.
- Fast response to host commands through:
  - 512-level command FIFO
  - 32-bit wide memory-mapped registers
- Programmable flat or paged memory model with linear frame buffer access
- Primary triple 8-bit palette DAC with gamma correction for true WYSIWYG color.
- Support for SDRAM and SGRAM at up to 125 MHz memory clock across a 64-bit interface, providing bandwidths up to 1GB/sec.
- Memory upgrade via industry standard SGRAM SO-DIMM, for reduced board area and higher memory speeds.
- DDC1 and DDC2B+ for plug and play monitors.
- External Spread Spectrum chip support to reduce EMI on digital interface.
- Power management with full VESA DPMS and EPA Energy Star compliance.
- Integrated hardware diagnostic tests performed automatically upon initialization.
- Single chip solution in 0.25mm, 2.5V CMOS technology.

### **1.3.6 CRT Port**

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This 15-pin CRT port supports standard VGA-compatible devices such as an external CRT monitor or projector.

### **1.3.7 PCIO-2 (RIO)**

---

RIO is a Sun proprietary 256-pin PBGA ASIC which is the new generation device providing several high-performance I/O functions.

- EBus channel engine, ISA compatible
- IEEE 802.3 MAC with Media-Independent Interface (MII)
- OpenHCI compliant USB controller: 1.5Mbit/s, 12Mbit/s capability

The Solaria 650 architecture provides one RIO, implements the EBus, Ethernet and USB interfaces.

### **1.3.8 Ethernet**

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RIO includes a 10/100Mbits Ethernet Media Access Controller (MAC) with Media-

Independent Interface (MII) for connection to an IEEE 802.3 PHY.

Solaria 650 uses the Lucent LU3X31T PHY, which has both 10Mbits and 100Mbits (auto-negotiating) capability.

### **1.3.9 USB**

---

Two Type A USB connectors support 1.5 Mbit or 12 Mbit transfer speed and operate independently of each other. These interfaces support USB devices including keyboard and mouse.

### **1.3.10 TOD & NVRAM**

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A combined Time-of Day (TOD) Clock and Non-Volatile memory (NVRAM) are included using an STMicroelectronics M48T59 device. This is a TOD Clock with an integrated battery and 8KB of NVRAM.

The NVRAM contains server identity and configuration data. For this reason, the device must be socketed to allow transfer between systems. The TOD is used by the operating system for timekeeping purposes and has a programmable interrupt for use as a software alarm.

### **1.3.11 OBP**

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The Flash PROM is a 1MB 5V Flash part, with an access speed grade of 120ns or faster. System firmware and diagnostic modules reside in this flash PROM.

### **1.3.12 South Bridge**

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The Solaria 650 South Bridge is the ALi M1535D from ACER Labs. The 1535 are a highly integrated system PCIO device in a 352-pin PBGA package that consists of the following:

- Dual IDE controller
- SMBus controller
- Two asynchronous serial interfaces
- Parallel interface
- Floppy drive interface
- AC97 audio interface
- Power Management Controller

### **1.3.13 IDE Controller**

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The IDE controller supports a maximum of four IDE devices via primary and secondary ATA buses. Each channel can operate independently at DMA mode 4 speed.

- Primary and secondary channels
- UltraDMA/66 capable
- PCI bus mastering at transfer rates to 132MB/sec

### **1.3.14 Audio Interface**

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The AC97 Version 2.1 compatible interface supports connection to an Audio CODEC. It is implemented with an optional Personality Module only.

### **1.3.15 Parallel Port**

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The Parallel Interface is implemented with an internal header.

- IEEE 1284 compliant
- ECP (Extended Compatibilities Port), EPP (Enhanced Parallel Port) compliant

### **1.3.16 Serial Port**

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Both serial channels are made available as RS-232 style external interfaces.

- 16450/16550 compatible UARTs
- 16 byte FIFOs
- Programmable Baud Rate

### **1.3.17 Floppy Drive Interface**

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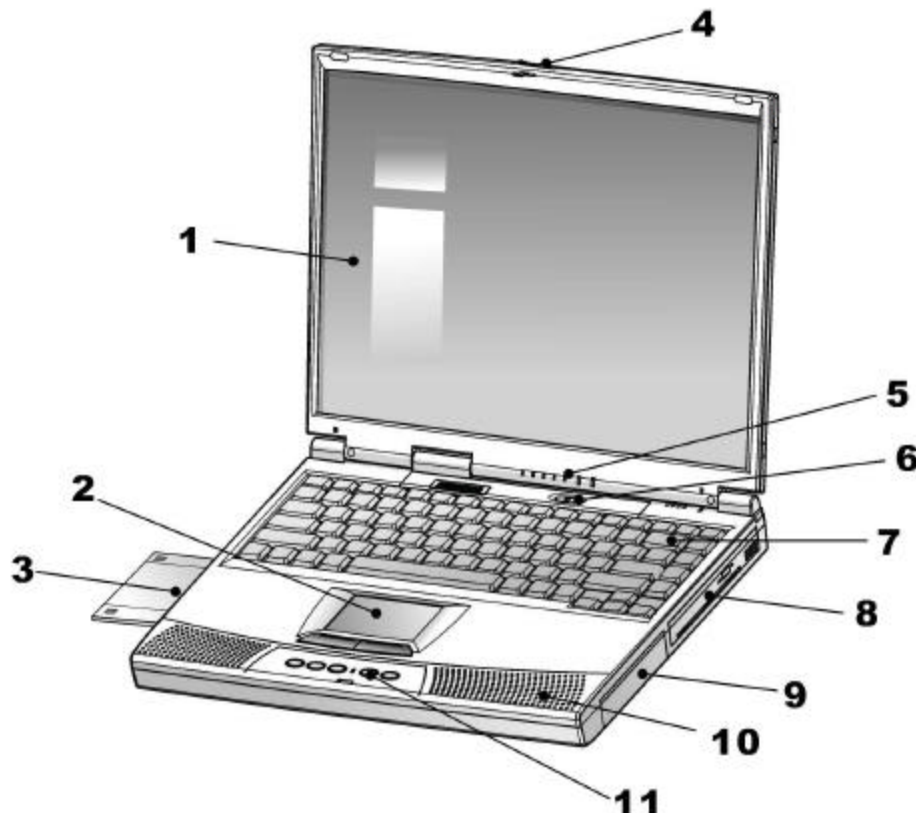
- 82077 compatible
- 16 byte data FIFOs
- Standard 1Mbps, 500kbps, 300kbps and 250kbps transfer rates
- 1.44MB, 1.2MB and 720kB Floppy Drive support

## **1.4 Identifying External Components**

Please refer to the picture below to identify all external components and accessories on the front right view of the Notebook computer.

### **1.4.1 Front View**

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*Front View of Solaria 650*

**1. Display—15" XGA or SXGA+ (Solaria 650) TFT LCD Screen**

The Solaria 650 uses a 15" TFT XGA/SXGA+ LCD panel supports resolution up to 1024 x 768(XGA) or 1400x1050(SXGA+).

**2. Touchpad**

The pressure sensitive Touchpad provides all the functions of a two-button mouse and **can not** be used simultaneously with an external USB mouse.

**3. PCMCIA Module**

NCM-767C integrates a PCMCIA Type I/II PCCard controller module that accepts that accepts our PCCard SCSI, Ethernet and other I-O devices

**4. Display Panel Latch**

The latch is used to secure the display panel. When the Notebook Computer not in use, please keep the display panel closed, the latch will lock the display panel to prevent dust accumulation.

**5. System Status LEDs**

These LEDs informs you the computer's current operating status.

**6. Power Button**

The power button allows to power on a nd power off the computer.

**7. Keyboard**

The low-profile keyboard emulates all the functions of a full-size keyboard including an embedded keypad and a full array of special function keys. The keyboard provides Solaris™ function keys to help ease navigation in the Solaris™ operating system.

**8. DVD-ROM Module**

The Notebook Computer comes with an enhanced IDE 5.25-inch DVD-ROM drive. The DVD-ROM is removable and can be swap

as a Combe Drive.

**9. Battery Module**

Lithium-Ion Battery Module.

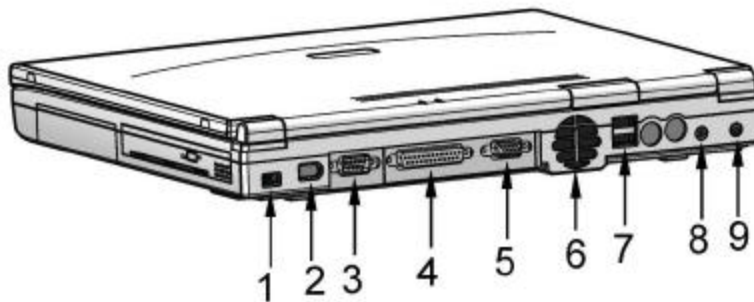
**10. Built-in Stereo Speakers**

**11. Personal ID Security Function Keys**

5 button pure hardware solution, 800K possible combination passwords.

### 1.4.2 Rear View

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*Rear View of Solaria 650*

**1. DC-In Jack**

The DC power input jack allows to connect a power adapter which converts AC power to DC power for Notebook Computer use and also charges the battery.

**2. IEEE 1394 (FireWire) Port**

Standard 6-pin firewire interface for faster asynchronous peripheral devices supporting transfer rates up to 400Mb/s.

**Currently this function is not available to be supported in Solaria 650.**

**3. Serial Port**

This 9-pin serial port supports RS-232 devices such as data terminal and modem.

**4. SCSI Port**

50 pin micro subd high density SCSI connector.

**5. CRT Port**

This 15-pin CRT port supports standard VGA-compatible devices such as an external CRT monitor or projector.

**6. Air Vent**

This area will bring the heat out for heat exchange.

**7. USB Ports**

These Universal Serial Bus ports were designed in full compliance with the Universal Serial Bus specification 1.0.

**8. Audio Line Out Jack**

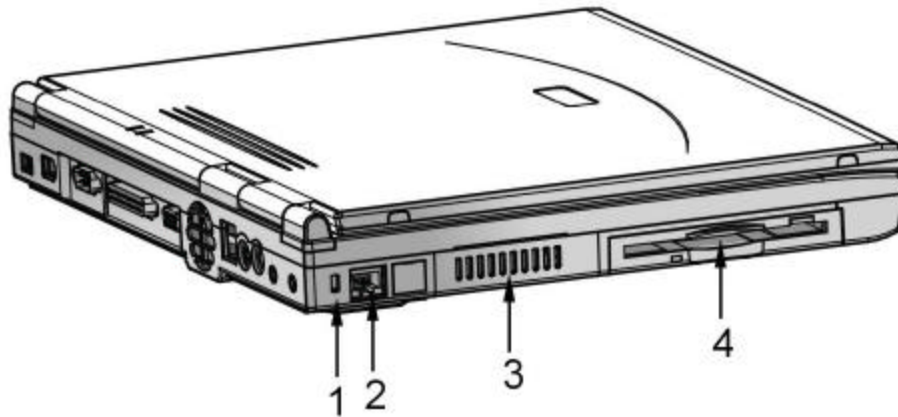
This stereo jack is used for connecting external stereo speakers or headphones.

**9. Audio Mic -In Jack**

This Mic-in jack is used to connect an external microphone.

**1.4.3 Left View**

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*Left View of Solaria 650*

**1. Security Lock port**

The security lock port allows to use the security Lock to lock your Notebook to a desk or other fixed object to prevent the Notebook Computer from being removed.

**2. Built-In RJ-45 Ethernet Jack**

The internal Ethernet supports 10Base-T or 100Base-TX standard networks.

**3. Air Vent**

This area will bring the heat out for heat exchange.

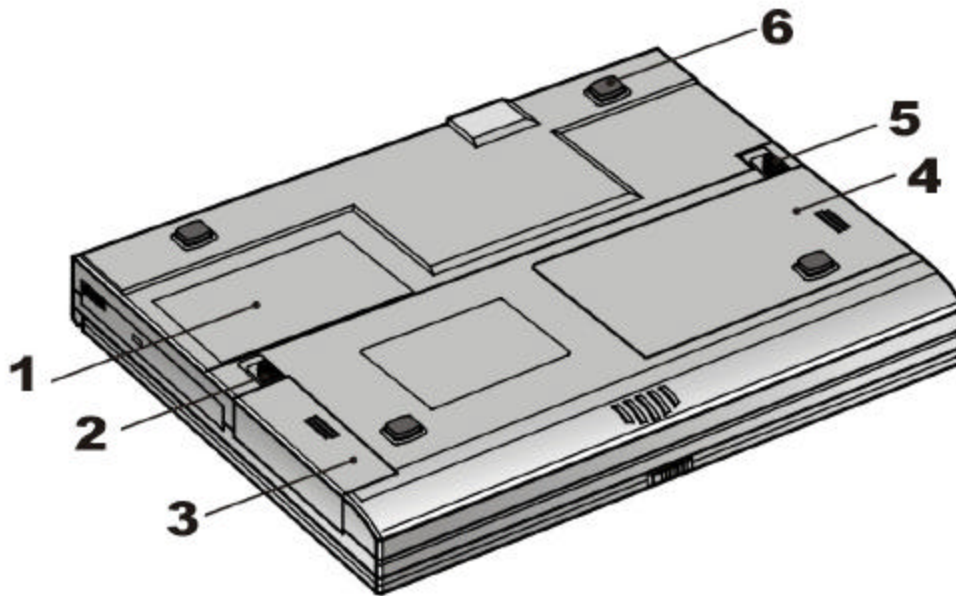
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#### **PCMCIA Module**

NCM-767C integrates a PCMCIA Type I/II PCCard controller module that accepts that accepts our PCCard SCSI, Ethernet and other I-O devices

#### **1.4.4 Bottom View**

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*Bottom View of Solaria 650*

1. **RAM Cover**
2. **Battery Module Latch**
3. **Removable Battery Module**

Your Notebook comes equipped with a factory-installed battery pack module. After the battery is depleted, the module can be

removed and replaced with a charged battery.

**4. PCMCIA Module**

NCM-767C integrates a PCMCIA Type I/II PCCard controller module that accepts that accepts our PCCard SCSI, Ethernet and other I -O devices

**5. FDD Module Latch**

**6. Rubber Stands**

The rubber feet are needed to elevate the notebook allowing air to pass freely beneath the system. This will help ensure proper cooling of the notebook.

## ***Chapter 2 Component Disassembly & Replacement***



***Keyboard  
Heat Sink  
CPU  
Floppy Drive  
Hard Drive  
Memory Module  
DVD-ROM Module  
2<sup>nd</sup> Hard Drive & 2<sup>nd</sup> Battery***



Before you start the component installation/replacement process, we recommend you to prepare some tools, which is needed and it will also help you to do the process smoothly.



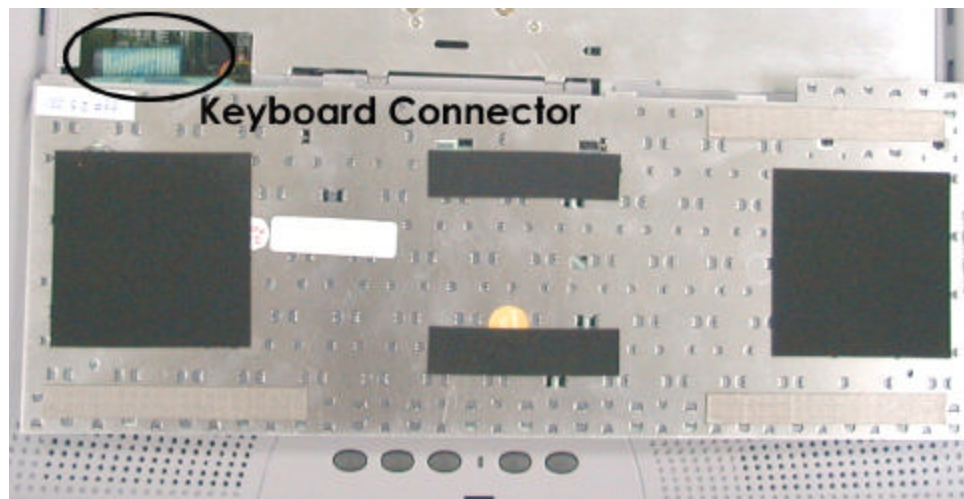
## 2.1 Keyboard

### 2.1.1 Release keyboard latches

There are two keyboard latches behind key [F4] and [F12]. Refer the picture below and find the location. Use an appropriate tool to put insert keyboard latches and turn over the keyboard. Please see the picture below to reference.







### **2.1.2 Release keyboard Connector**

You can find the keyboard's cable and connector easily after turning over keyboard. Use an appropriate tool to release the latch of connector. You have to do this procedure very carefully; the latch of connector is easy to be damaged. Release the latch and pull the keyboard cable. Then you can remove the keyboard safely.





## 2.2 Heat Sink

### 2.2.1 Release screws of keyboard cover

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There are two screws need to be released. Refer picture below and find the location. Use a screwdriver to release these two screws.



### 2.2.2 Remove keyboard cover

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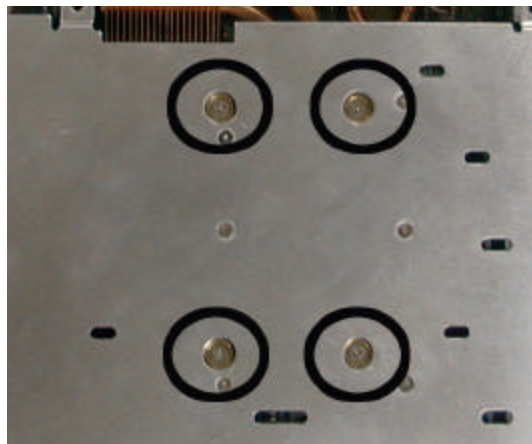
Push the cover towards the arrow as step 1; then pull the cover as step 2 to remove keyboard cover.



### 2.2.3 Release screws of heat sink

---

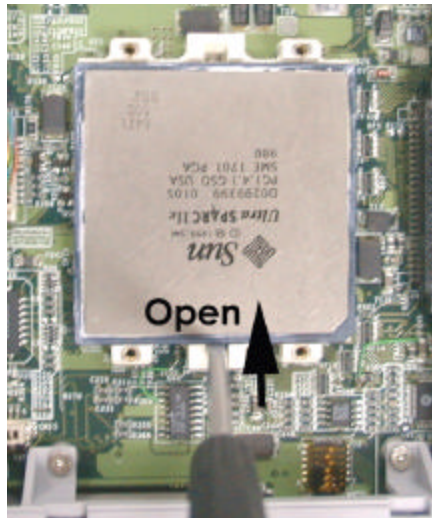
There are four screws on the heat sink. Use screwdriver to release these four screws and remove the heat sink.



## 2.3 CPU

### 2.3.1 Remove CPU

You can find Ultra SPARC IIi CPU after removing keyboard and heat sink. Use a screwdriver and insert to the interval of CPU socket. Move the screwdriver towards the arrow as picture below to loose CPU. Then you can remove CPU from the socket.

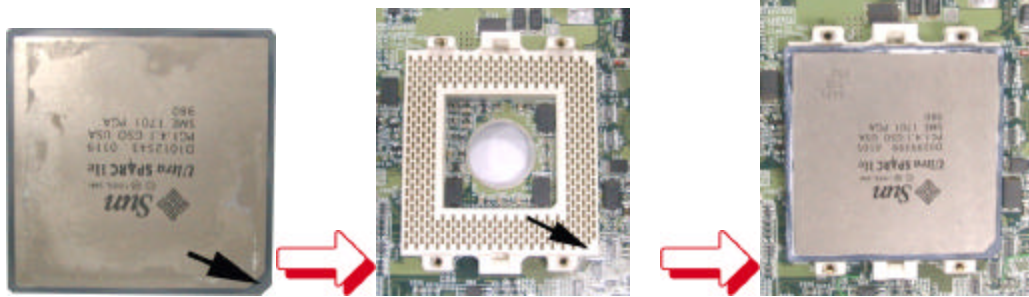


### 2.3.2 Install CPU

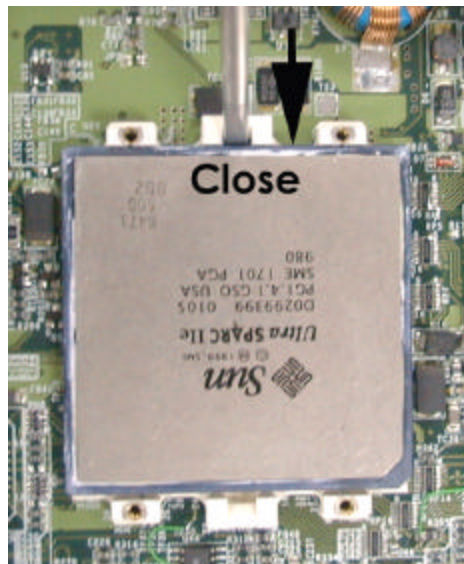
- Before you install CPU, you have to understand what Ultra SPARC IIi CPU looks like. Refer picture below to identify CPU.



- Follow the procedure as picture below to install CPU.



- Use a screwdriver and insert to the interval of CPU socket. Move the screwdriver towards the arrow as picture below to tight CPU.

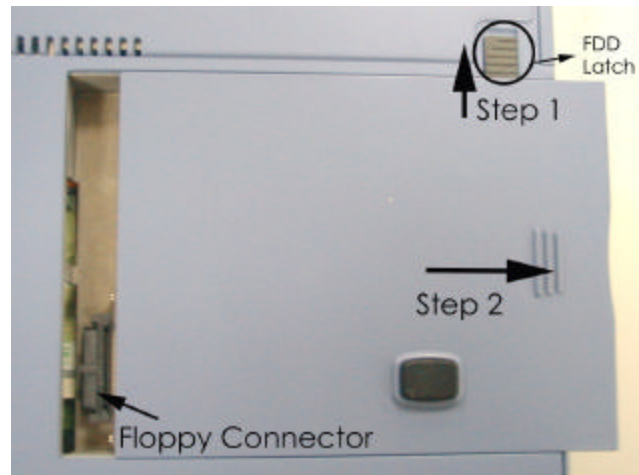


## 2.4 Floppy drive

### 2.4.1 Remove Floppy Drive

---

Refer the picture below to reference. Gently push on the FDD latch towards the arrow as step 1 and hold on the FDD latch, pull the FDD out as step 2.



### 2.4.2 Floppy Drive disassembly

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If the floppy drive damaged and need to be change, follow the procedure to replace floppy drive.

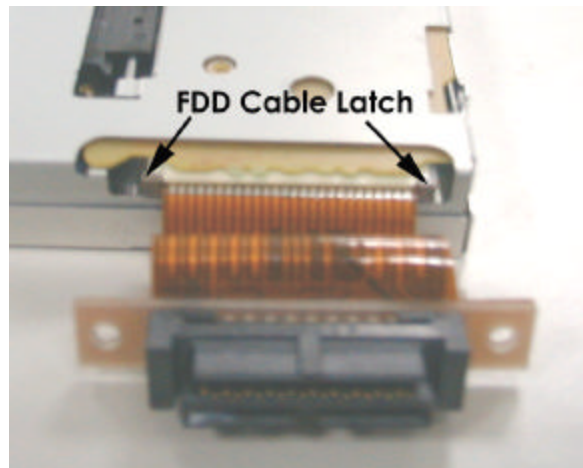
- There are four screws to hold up the floppy drive where located on both side of floppy holder. Use a screwdriver to remove these four screws.



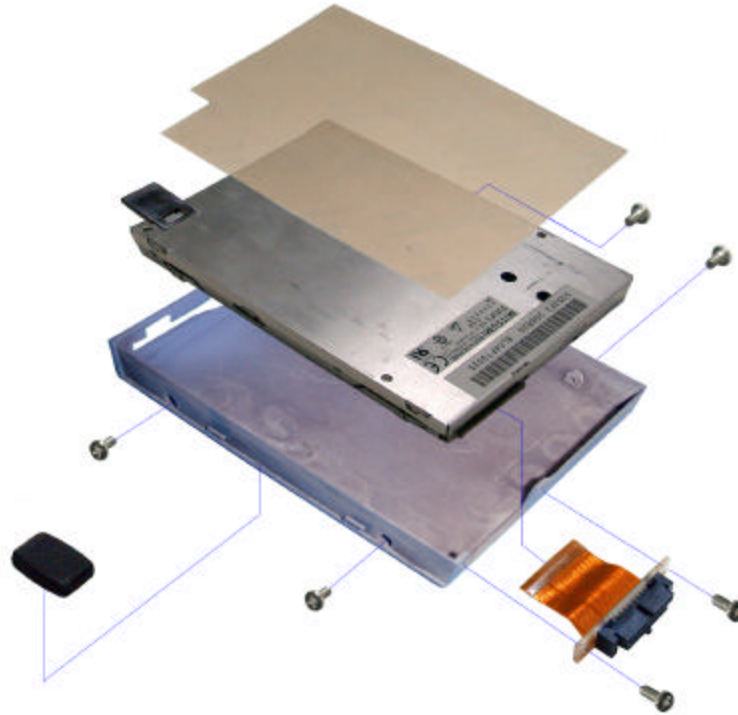
- Refer the picture below and find two screws which to hold up FDD connector. Use a screwdriver to remove these two screws.



- Now you can remove floppy drive from its holder. Refer the picture below to find the FDD cable latch. Use an appropriate tool and gently pull the latch to remove FDD cable.





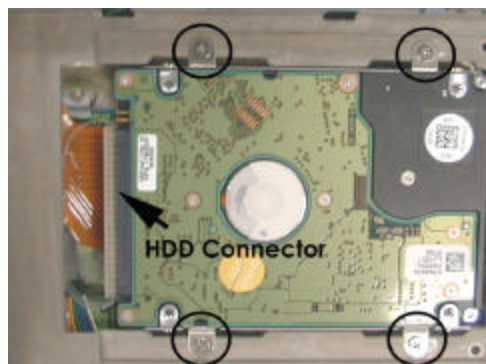


## 2.5 Hard Drive

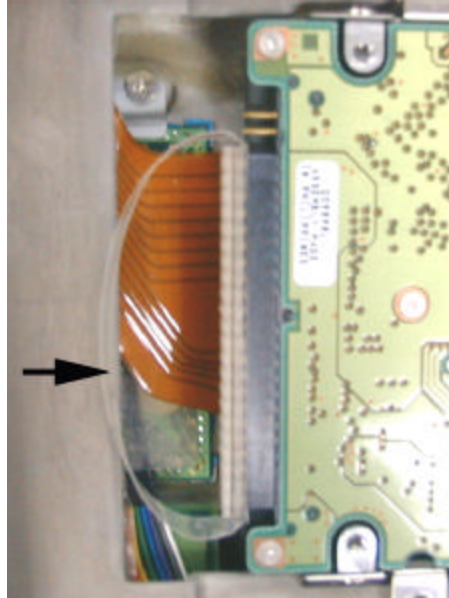
### 2.5.1 Remove HDD

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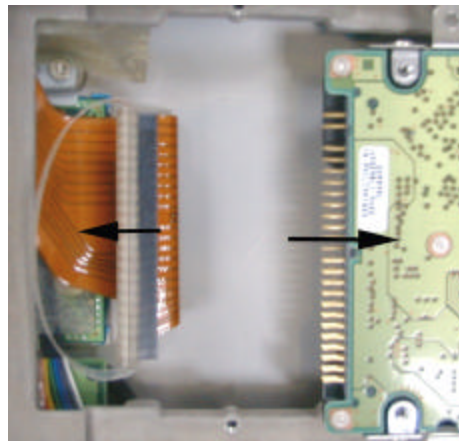
- After removing floppy drive, you can find hard drive. In order to remove hard drive, there are four screws need to be removed. Refer picture below and find these four screws. Use a screwdriver to remove them.



- Refer picture below and you can find the ribbon of HDD connector.



- Hold on the ribbon and gently pull out hard drive.



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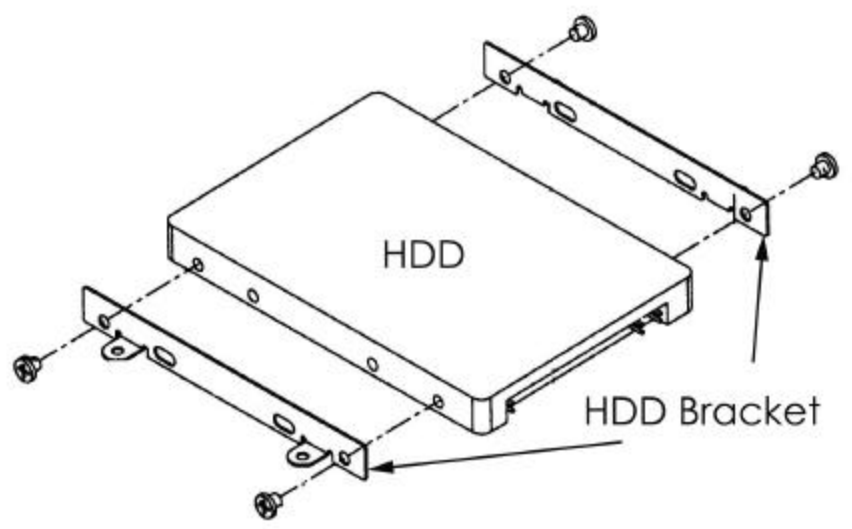
### 2.5.2 Hard Drive Accessory

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#### HDD Bracket

There are two HDD brackets to hold up hard drive. The HDD bracket needs to be installed before install HDD to the system. If you need to

change a new hard drive, don't forget the HDD bracket.



### 2.5.3 Install Hard Drive

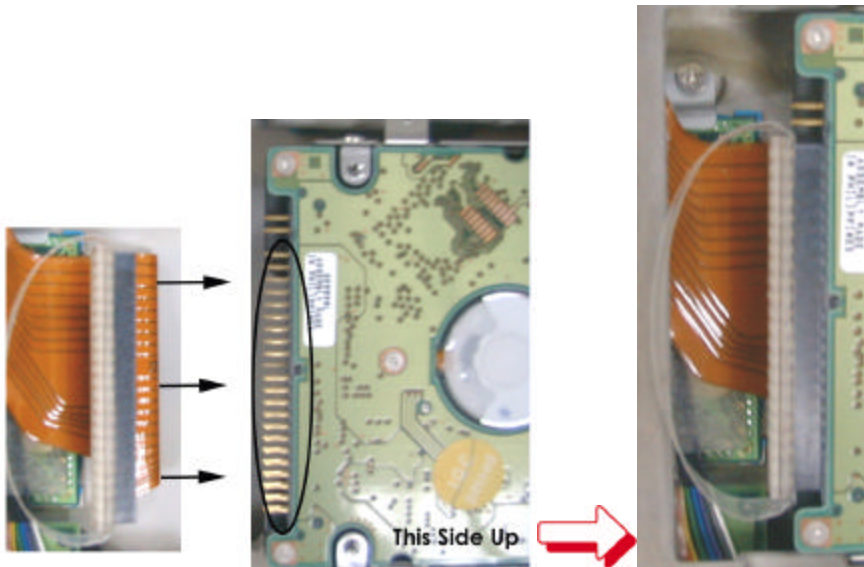
- Prepare your hard drive and install HDD bracket.





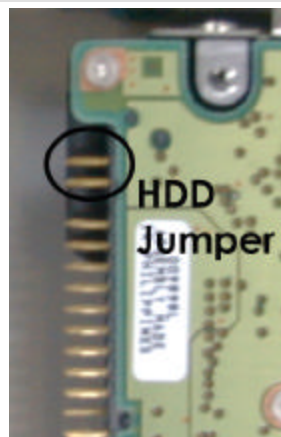


- Insert the HDD to the HDD connector.



**Notice**

- There are four pins for jumper setting of hard drive.
- Do not insert these pins to the HDD connector to avoid HDD malfunction.

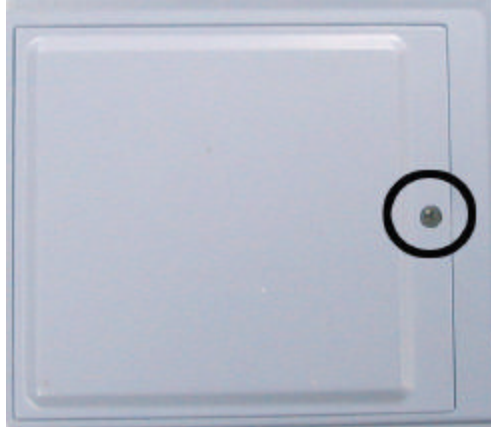


## 2.6 Memory Module

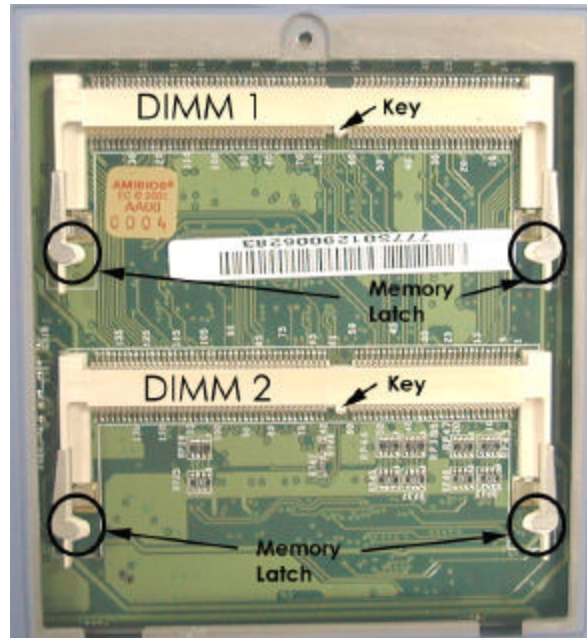
### 2.6.1 Remove Memory Module

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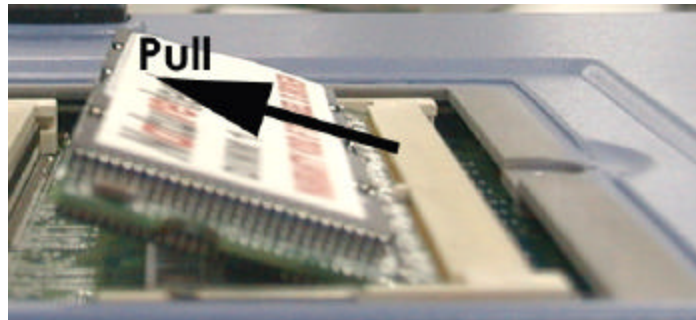
- Refer to picture below and find the screw for RAM cover. Remove the screw and open the RAM cover; you can find the memory module and socket.



- Pull the latch of RAM socket; memory module will be released automatically. See picture below to reference.

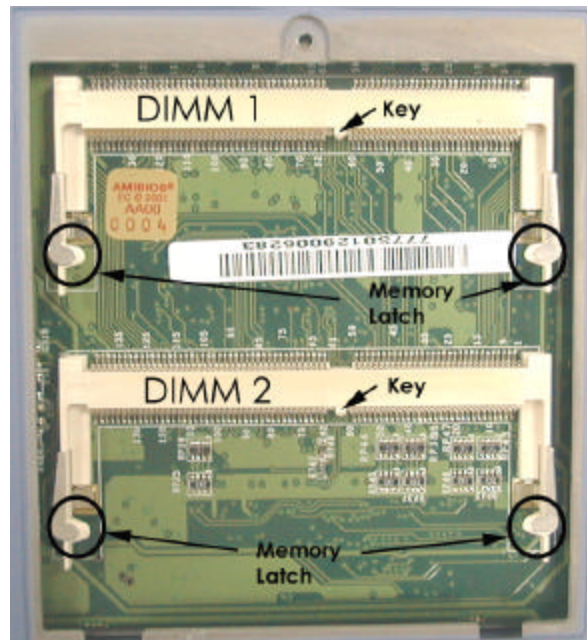


- Pull the memory module out from the socket.



### 2.6.2 S.O.DIMM Socket & Memory Module

- Solaria 650 provides two 144-pin S.O.DIMM sockets. The picture below describes the mechanical construction.



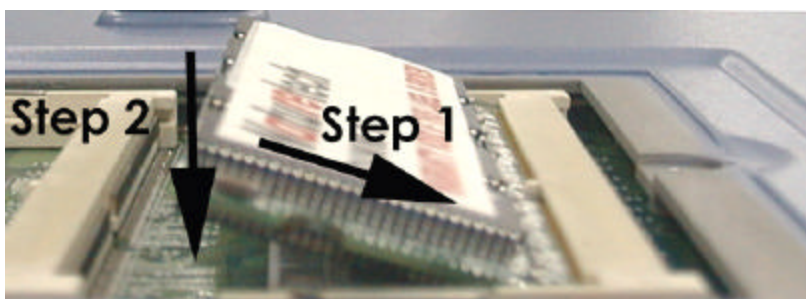
- Solaria 650 supports only buffered PC133 type Non-standard ECC (Error Checking & Correction) SDRAM S.O.DIMM. System is equipped with two 144-pin S.O.DIMM sockets. The memory module is not an ordinary memory for laptop computer; please do not install memory on yourself. Contact your vendor for upgrade memory.



System will not work if you install a standard 144-pin SDRAM S.O.DIMM. Contact vendor for the memory installation & upgrading.

### 2.6.3 Install/Upgrade Memory

- Gently slide the memory module into the memory socket with an angle (about 30~45 degree) towards the arrow as step 1 then push the memory module down into position as step 2.



- Make sure the memory latches lock the memory module completely to ensure memory contact the socket very well.
- Memory Combination

Max. Supported Memory	2GB
Possible Memory Configurations	256MB / 512MB / 768MB / 1GB/2GB
Memory Sockets	Two 144-pin SDRAM S.O.DIMM
ECC features	Single bit Error Checking & Correction Double bit Error Checking & Correction

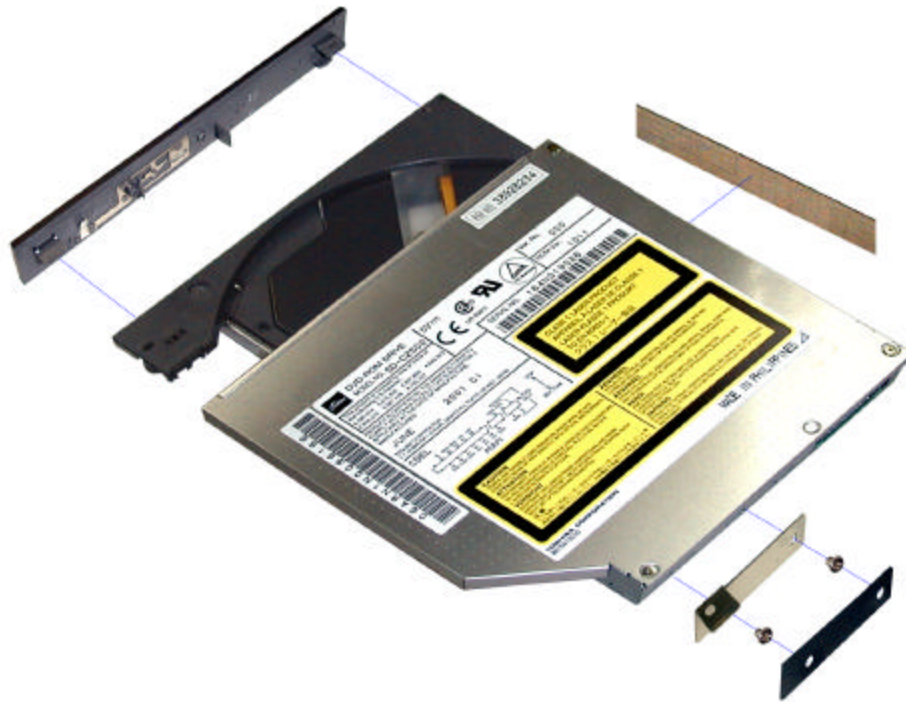
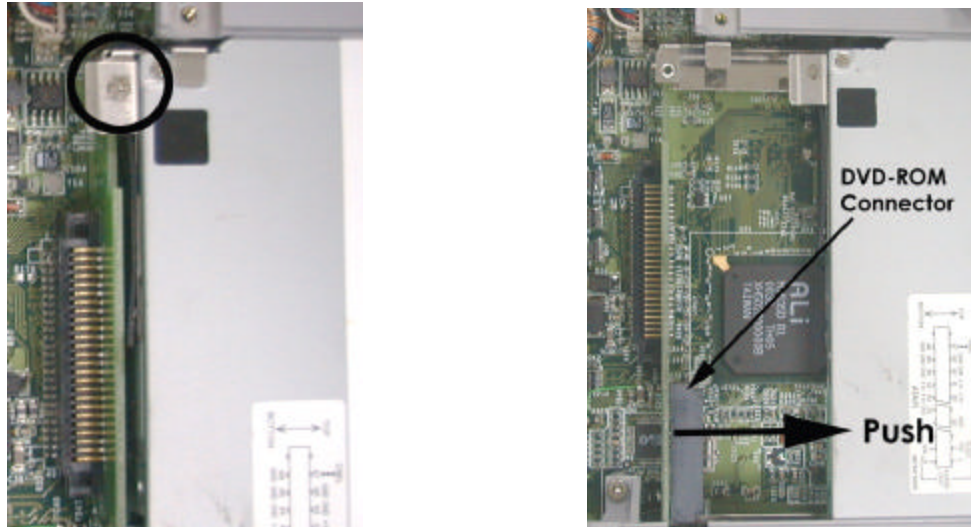
**Memory upgrade Notice:**

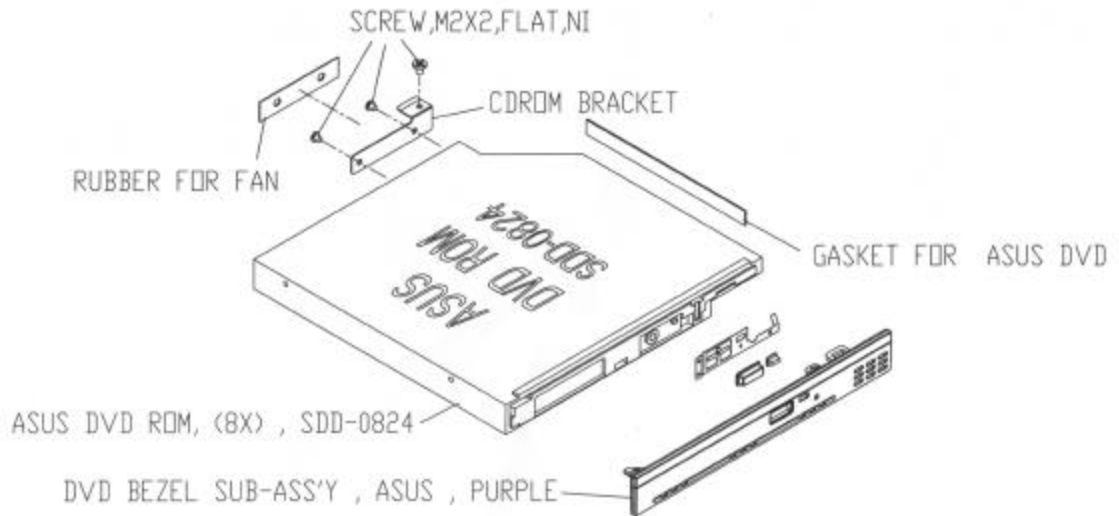
- SiGNAL provide two memory modules for DIMM 1 & DIMM 2, see the picture below and reference. **DIMM 1 & DIMM 2 has different electrical specifications.** The label for each memory will mark "**DIMM 1**" and "**DIMM 2**". If switch the memory location, system won't boot up.
- Before you upgrade memory, make sure which DIMM and what size you want to change.
- Remember to have a remark for memory DIMMs when you order memory module from SiGNAL.
- The Memory Module only provided by SiGNAL.

## 2.7 DVD-ROM Module

1. After removing the keyboard and heat sink, you can see the DVD-ROM drive and its connector. Refer to the picture below; there is one screw to hold up the DVD-ROM. Use a screwdriver to remove the screw.
2. Push on the DVD-ROM module towards the arrow as picture below and pull the DVD-ROM out from its holder to remove the DVD-ROM module.







## 2.8 2<sup>nd</sup> Hard Drive & 2<sup>nd</sup> Battery

SiGNAL provides 2<sup>nd</sup> hard drive and 2<sup>nd</sup> battery as optional devices. The 2<sup>nd</sup> hard drive can expand storage capacity for Solaria 650 and 2<sup>nd</sup> battery will extend battery life for Solaria 650 when you need to work outside without AC power source. The 2<sup>nd</sup> hard drive and 2<sup>nd</sup> battery can easily swap with floppy drive. Just remove the floppy drive and change to 2<sup>nd</sup> hard drive or 2<sup>nd</sup> battery.



In order to use 2<sup>nd</sup> hard drive and 2<sup>nd</sup> battery, you must shutdown system and swap with floppy drive. Do not swap 2<sup>nd</sup> hard drive and 2<sup>nd</sup> battery while system is running.



## ***Chapter 3 System Disassembly and Assembly***



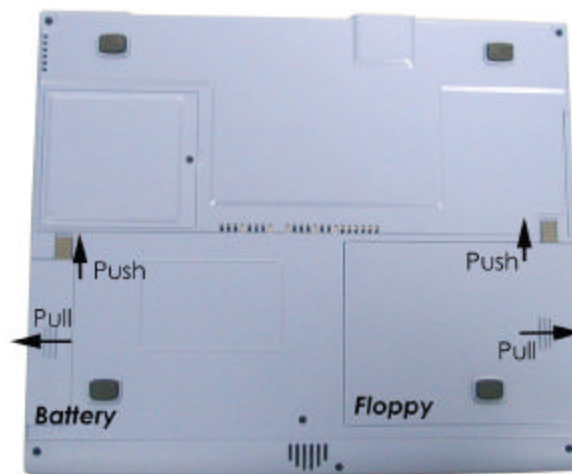
***System Disassembly  
System Assembly  
Component Exchange***

This chapter describes the procedure to assembly/disassembly Solaria 650. The disassembly instruction will help technician to repair/exchange key component.

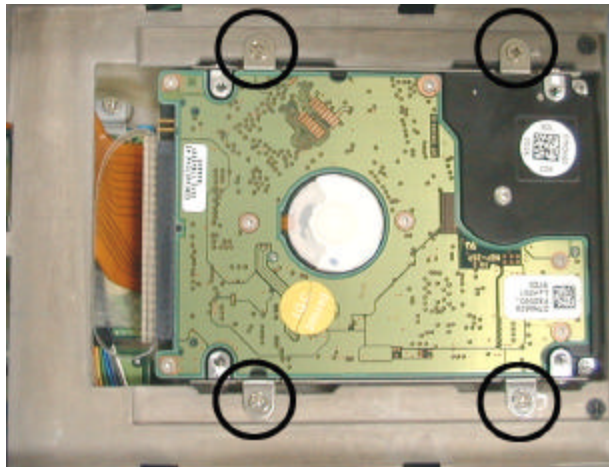
**For component disassembly, read chapter 2 for detail information.**

### 3.1 System Disassembly

Step 1: Turn over the notebook and remove battery pack and floppy drive.



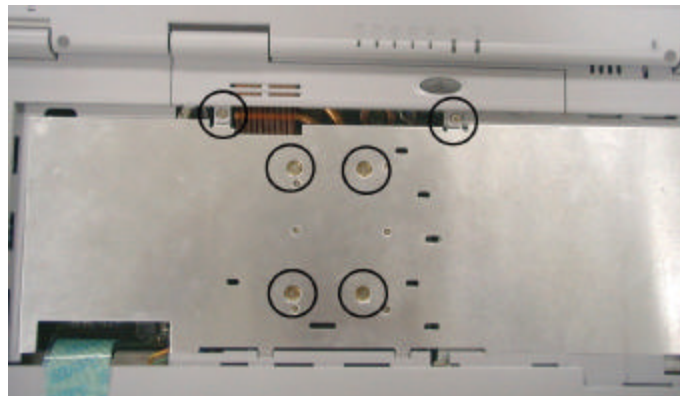
Step 2: Remove Hard Drive



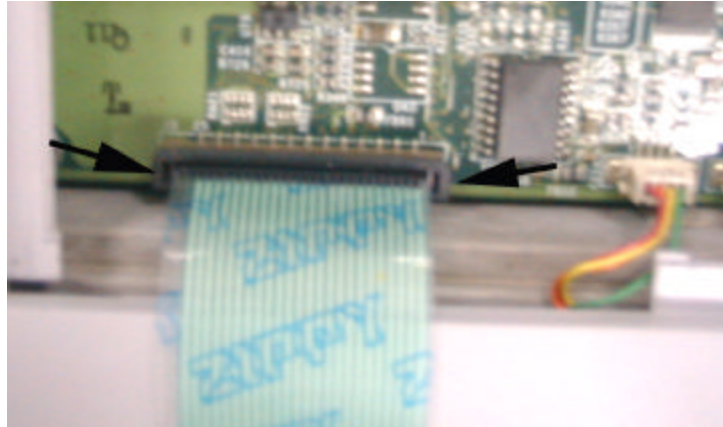
Step 3: There are ten screws need to be removed. Refer to the picture below and find the location of screws. Use a screwdriver to release them.



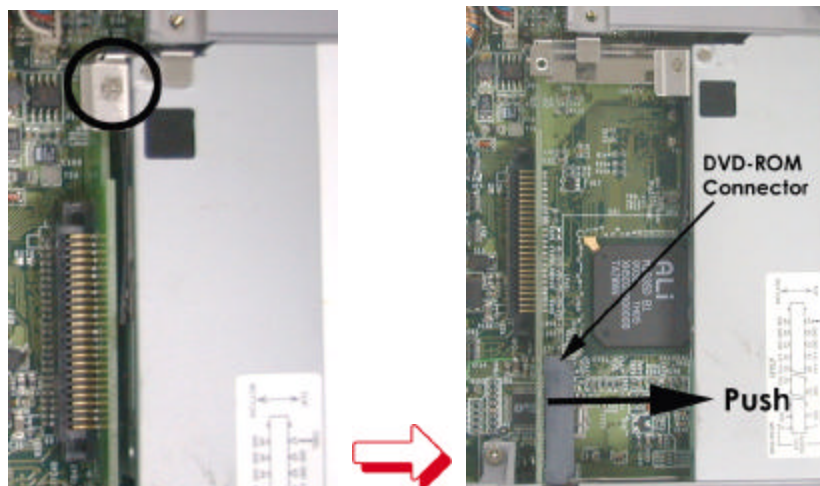
Step 4: Turn over the notebook again and open the LCD panel. Open the keyboard and remove two screws for keyboard cover and four screws for heat sink. Then remove keyboard cover and heat sink.



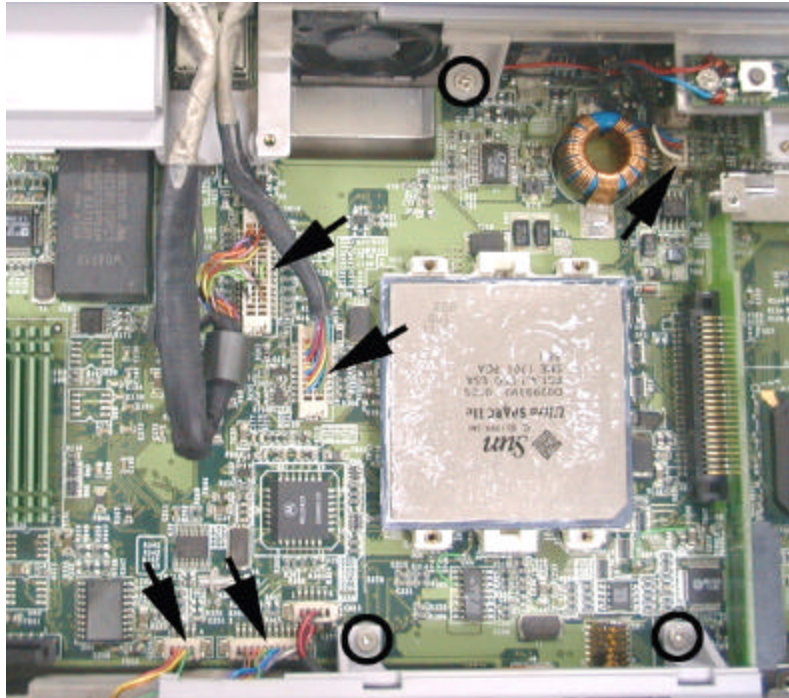
Step 5: Gently release the latch of keyboard connector and pull the keyboard cable away.



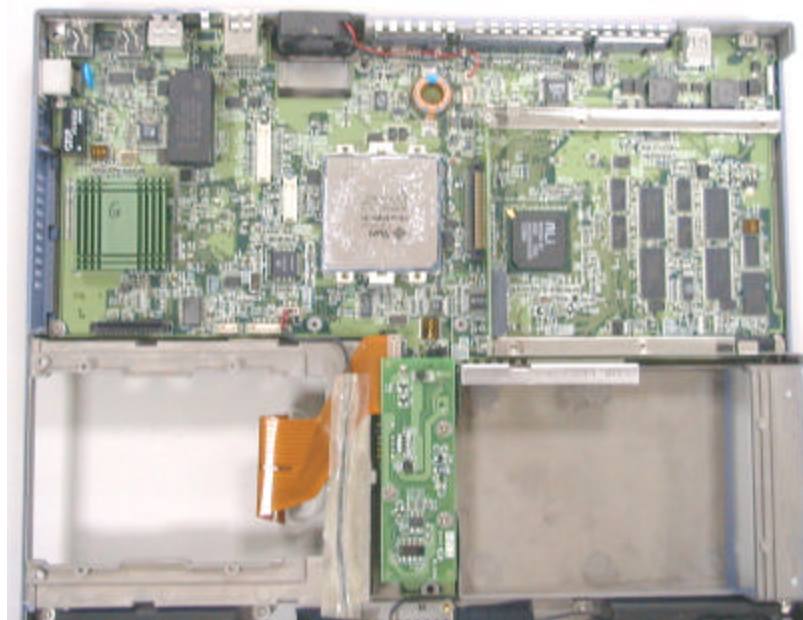
Step 6: Remove DVD-ROM



Step 7: Remove three screws and five connectors. Refer to the picture below to find the location for screws and connectors. In order to remove these connectors, you have to pay more attention with it. Find an appropriate tool to remove these connectors. These connectors are easy to be damaged. **Do not pull them just by hand.**

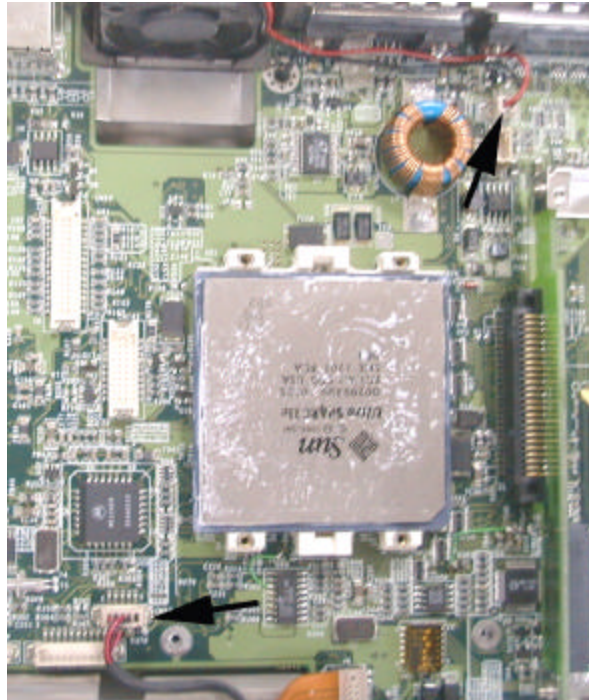


Step 8: Now you can remove the LCD panel and C-Cover safely.

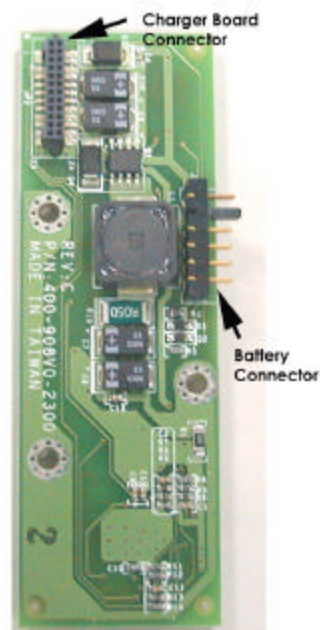
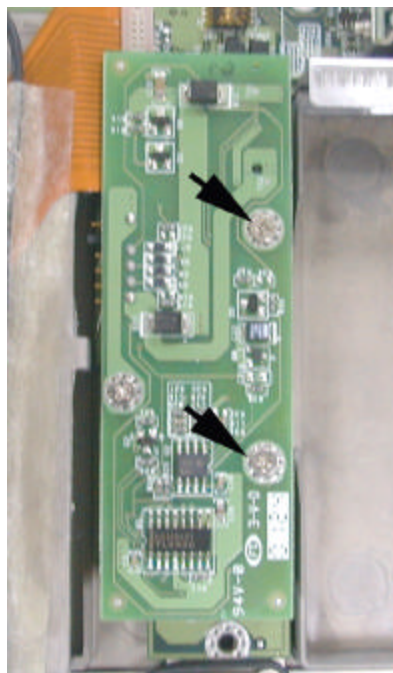




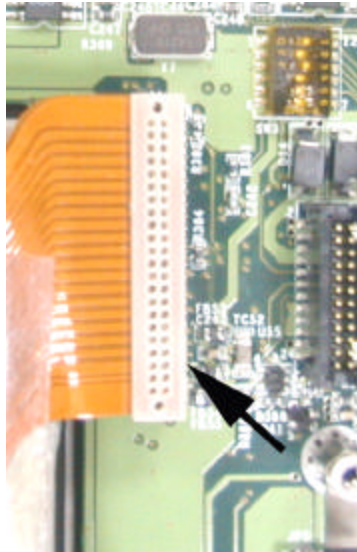
Step 9: Remove fan connectors for fan and speakers. Refer to the picture below to find the location. Use an appropriate tool to remove them, Do Not pull them just by hand.



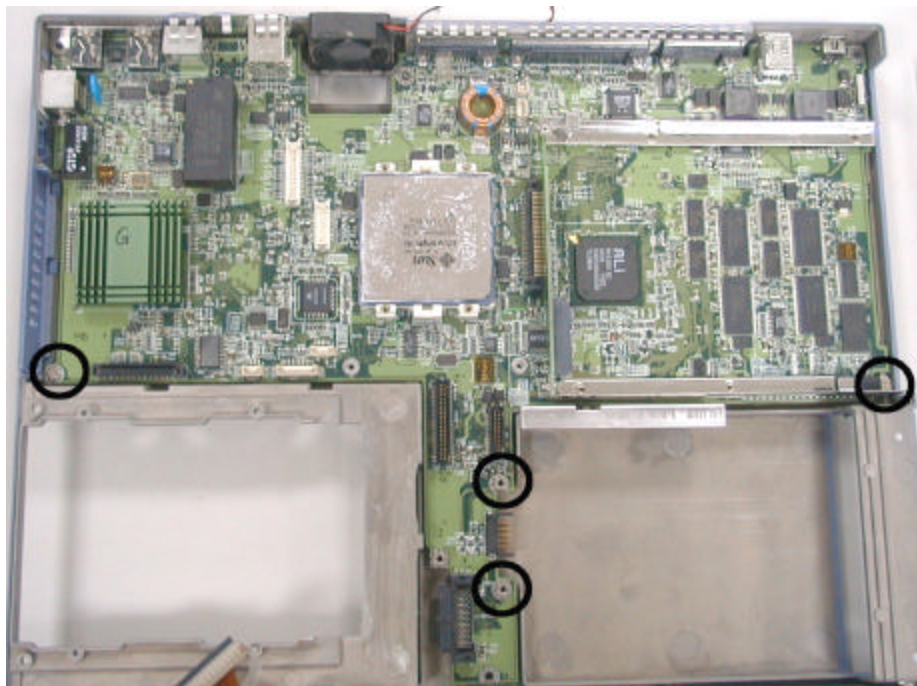
Step 10: Remove charger board. The duty of the charger board is charge battery. Remove two screws where marked in the picture below and pull the charger board up.



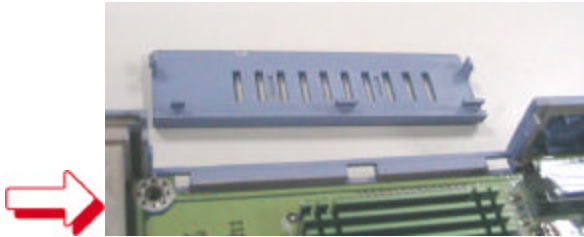
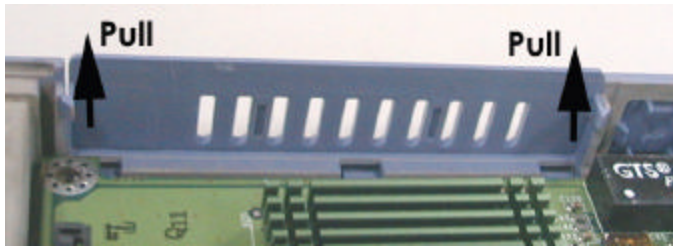
Step 11: Pull the HDD connector away from its connector of motherboard.



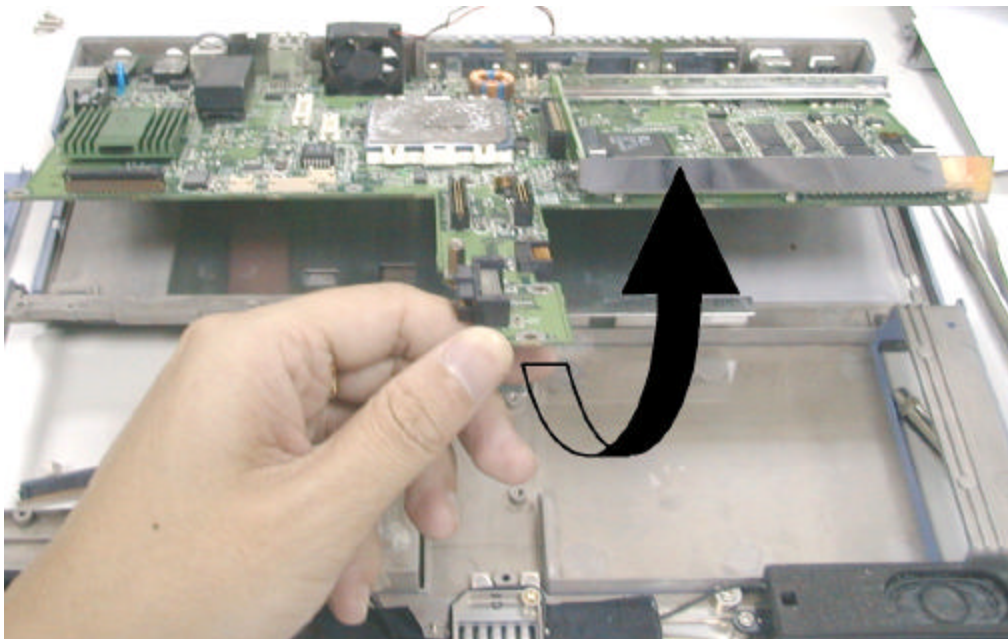
Step 12: There are four screws need to be removed. Refer to the picture below to find the location and remove them.



Step 13: Remove ventilation cover.



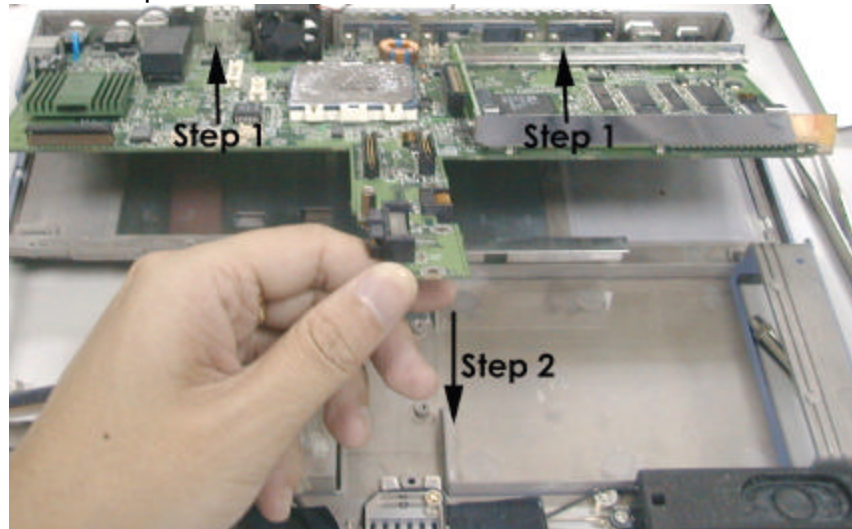
Step 14: Remove motherboard from D-Cover. See picture blow to reference.



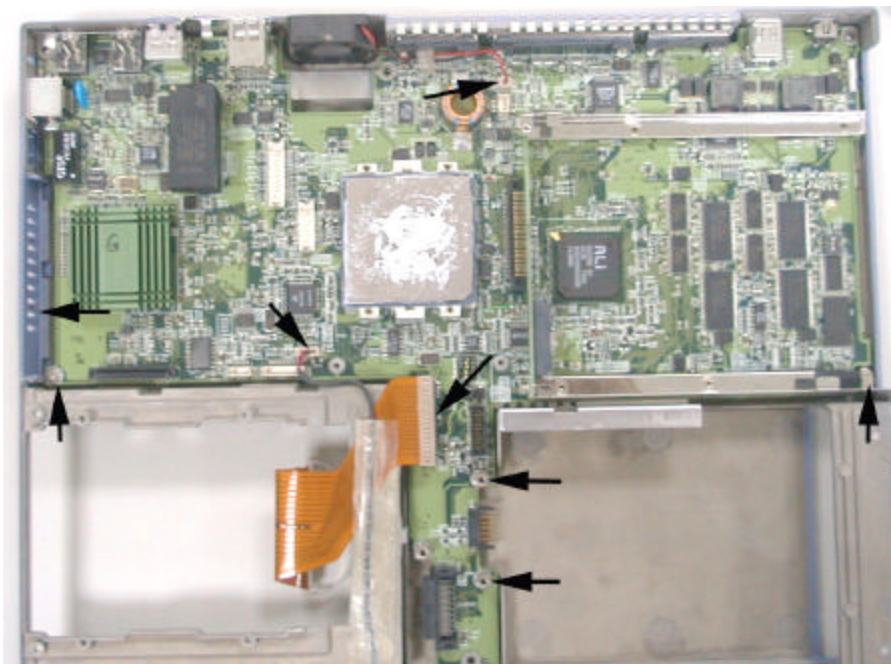


### 3.2 System Assembly

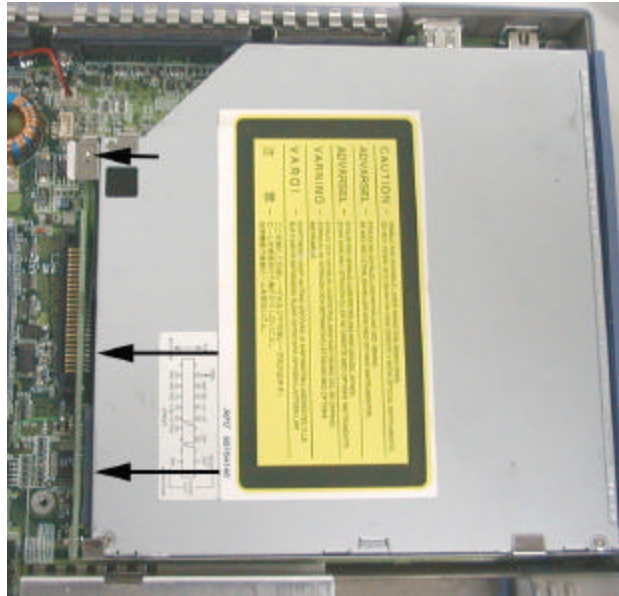
Step 1: Put back the motherboard. Slide the motherboard into D-Cover towards the arrow of step 1 and put down the motherboard towards the arrow of step 2.



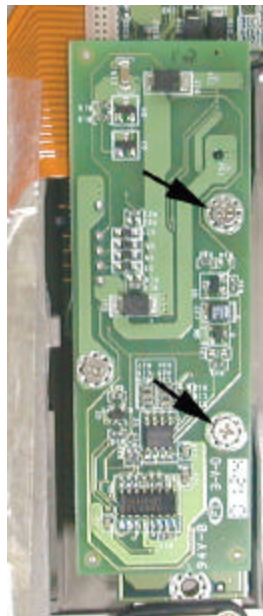
Step 2: In this procedure, you have to put everything back. (Screws/connector/cable/ ventilation cover) Refer to the picture below and find locations as marked.



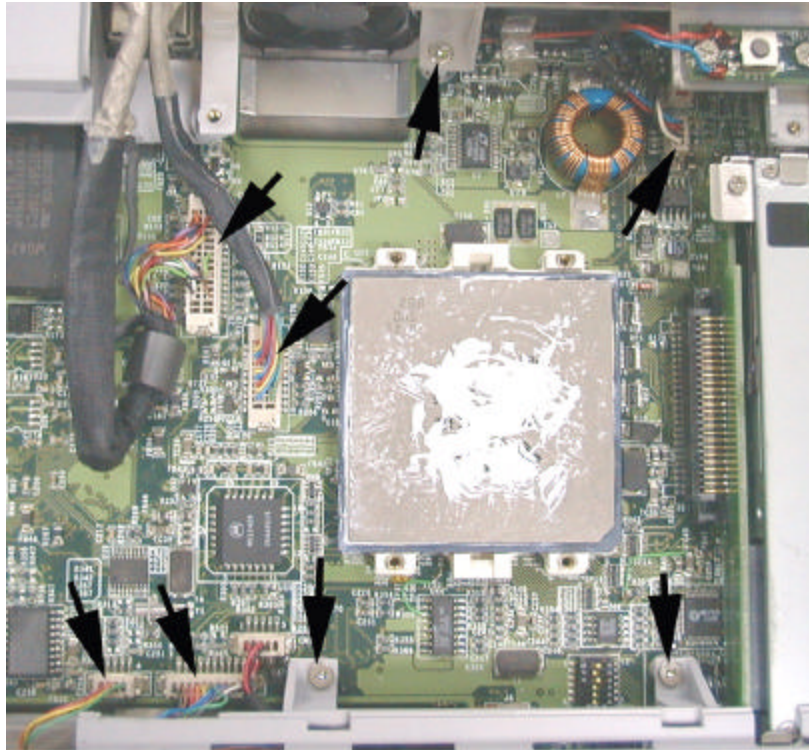
Step 3: Insert DVD-ROM and mount the screw. The connection for DVD-ROM and connector of motherboard has to be very closed.



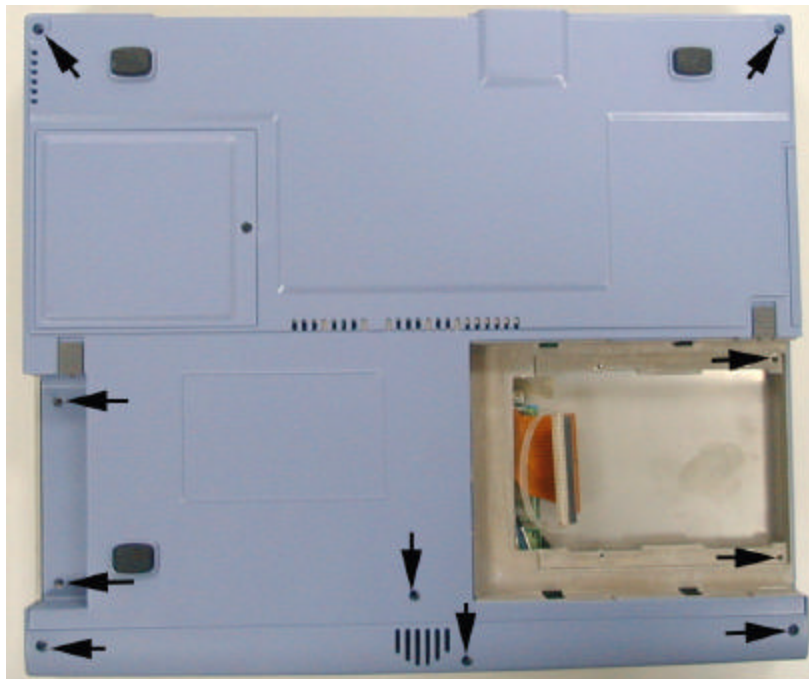
Step 4: Put back the charger board and mount its screws.



Step 5: Put back LCD panel & C-Cover subsystem. Insert all cables to its connector and mount three screws back.



Step 6: Turn over the notebook and mount ten screws back. Refer to the picture below to find locations. Don't miss any screws for the notebook.

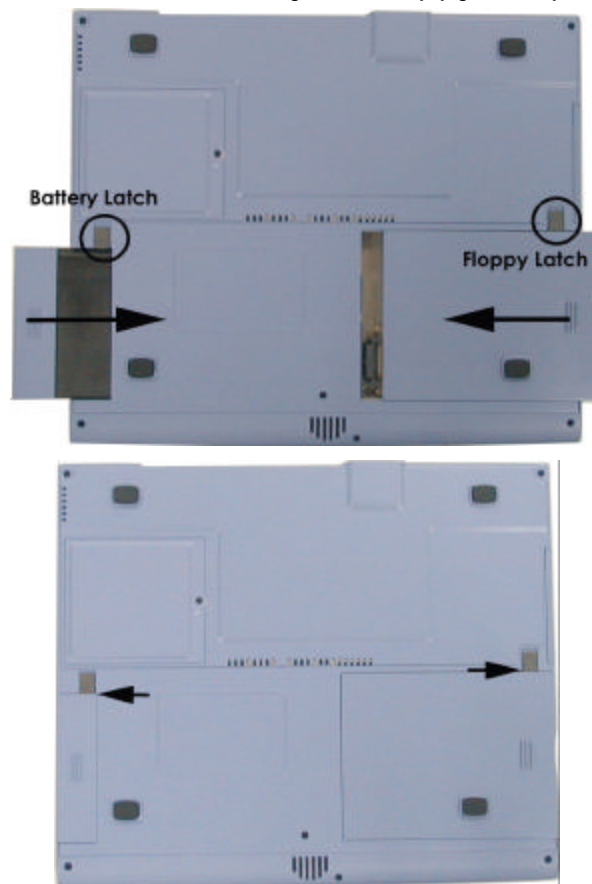




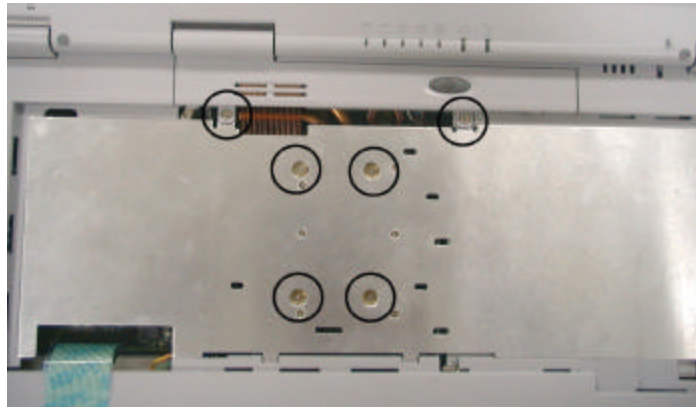
Step 7: Insert HDD to its connector and mount four screws back.



Step 8: Install Battery pack and Floppy drive. The latches for battery and floppy have to lock the battery and floppy completely.



Step 9: Insert the keyboard cable back to its connector and lock the latch. Then put heat sink and keyboard cover back to the position. Mount all screws back.



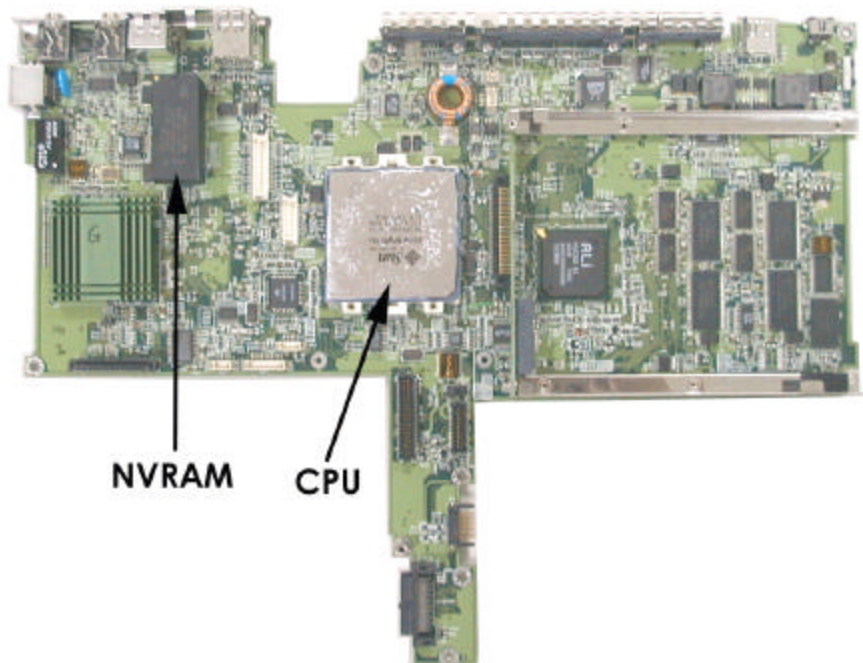
Step 10: Put the keyboard back and push on the locations as picture below to lock the keyboard.



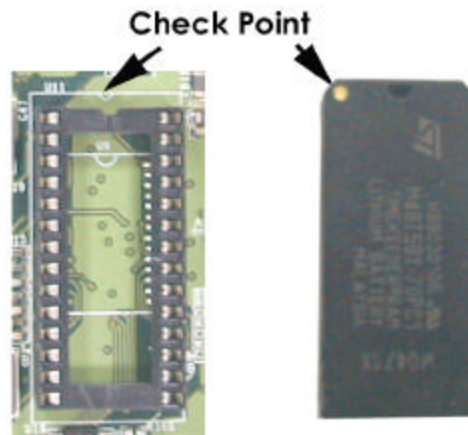
### 3.3 Component exchange

#### 3.3.1 Motherboard

- If the motherboard damaged and need to be replaced, follow the instruction of system disassembly, you can remove the motherboard. You have to remove original CPU/NVRAM/Memory Module from damaged motherboard and put them on new motherboard. **There is no NVRAM on new motherboard for spare part.** Each Solaria 650 has its HOSTID and Ethernet address, they are unique for each Solaria 650, so you have to get the original NVRAM to install on new motherboard.

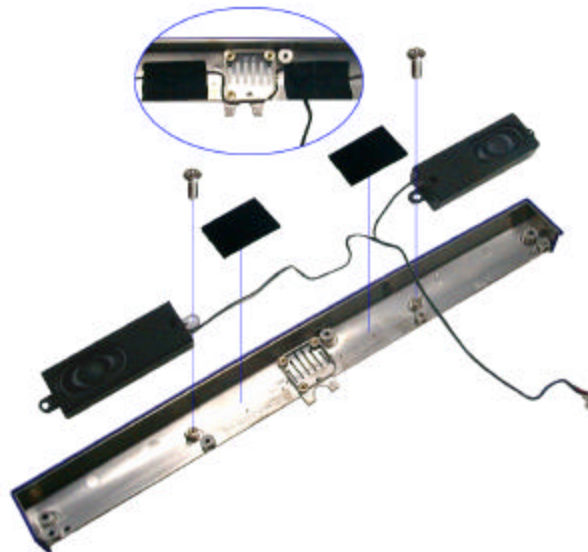


- In order to remove the NVRAM, you have to use an appropriate tool and remove it with care. When you install NVRAM, you have to match the checking point for NVRAM and its socket. Otherwise the system won't boot up if install NVRAM in the wrong way.



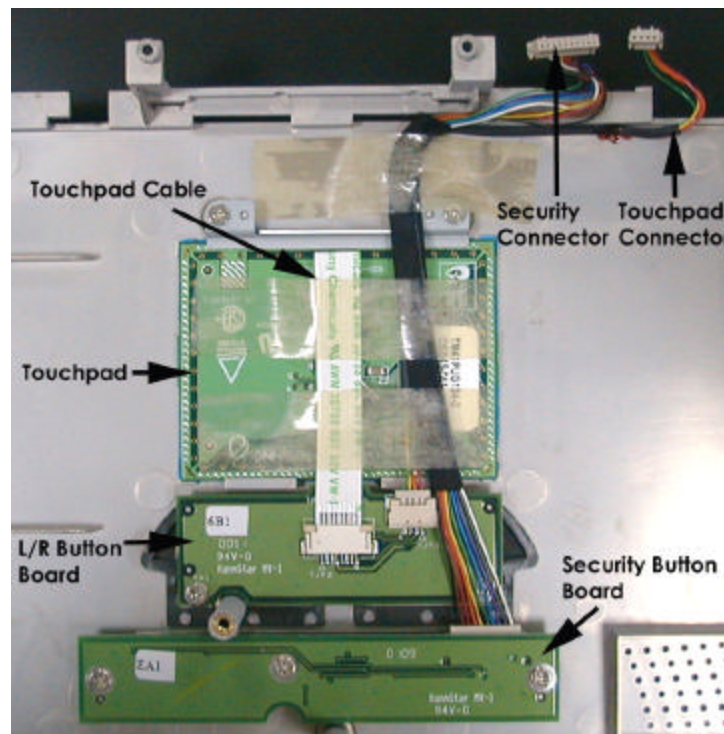
### 3.3.2 Speakers

The speaker module is located in the D-Cover. There are two screws to hold up speakers. You have to remove the screws to replace speaker module. The spare part for speaker will come with two speakers and its connector.



### 3.3.3 Touch Pad & Security Button Board

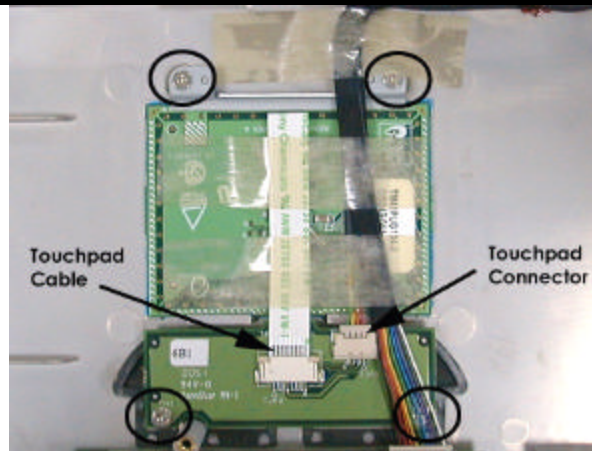
This session describe how to replace Touchpad and Security Button. Refer to the picture below and you can find Touchpad, Left/Right Button board and Security Button Board. You can turn over the C-Cover to find these devices.



- **Touchpad**

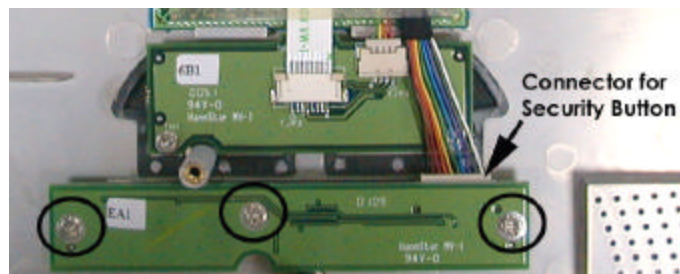
In order to replace Touchpad, you must remove four screws that marked as picture below. The Touchpad and L/R Button board is separate and connect by the Touchpad cable. If your Touchpad malfunction, make sure which part damaged (Touchpad, Cable or Connector) then just replace it.

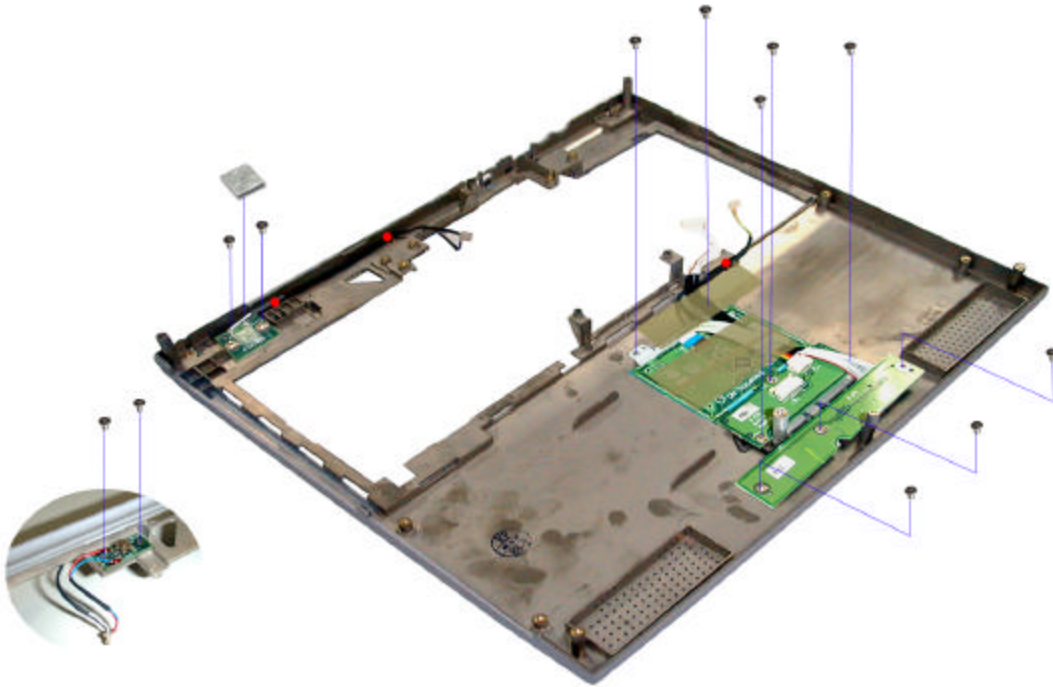




- **Security Button Board**

The Security Button Board provides five buttons for Personal ID Security settings. If you enter the right password and system not boot up, you can check the Button Board and its connector. If you must replace the Button Board, remove three screws marked as picture below then you can remove the Button Board from C-Cover. Make sure which part damaged (Button Board or Connector) then replace it.





## ***Chapter 4 Security System***



***Personal ID Security  
Firmware Security  
Software Security***

This Chapter describes the security system for Solaria 650. There are three security levels to secure your data. The security system contains hardware, firmware and software security. Refer to the following description for detail information.

#### **4.1 Personal ID Security**



The personal ID security is a unique, self-contained digital signature ciphering security/tracking device. A simple and intuitive 4-button keypad interface allows for over 800K password possibilities with any combination up to 5 buttonstrokes. The personal ID security requires no software intervention, rendering the locking mechanism relatively hacker-proof. The personal ID security function is designed for secure your data, preventing unauthorized access to the system.

We provide purely hardware operation. When the security password

being created, you can't "Power On" your notebook without password.

### **4.1.1 Functional Description**

System is armed with the user password. The supervisor password acts as the master key to computer, guaranteeing the authenticated use of the system. Preventing unauthorized access to the system is the user password.

The user initializes by entering the user password (UP) through the 4-button security keypad to activate Security mode. When the system is on, personal ID security will enter security mode as long as a valid user password is found. LED signal is asserted to indicate security mode is armed.

System is remaining locked if user fails to enter the correct password 3 times continually (false count). Password enter is still possible at this time, as long as ESCAPE timer is not yet expired. After ESCAPE timer expired, system goes to power saving mode state. If suspend timer is expired, process then restart again.

#### **4.1.1.1 Entering the Supervisor Password (SVP) and User Password (UP)**

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Holds down button 1 and the enter button together for more than 5 seconds takes the personal ID security to user password input mode. Holding button 2 and the enter button together takes the personal ID security to supervisor password input mode. Upon entering the beginning of any password input mode, LED will start blinking until enter button is pressed. There are 4 dedicated security buttons to the personal ID security, and a password up to 5 buttonstokes can be entered. Multiple buttons can be entered together as one single buttonstoke. To complete the password keying process, press the enter button. After entering the password, the personal ID security will enter to security mode when the system is powered off and restarted.

#### **4.1.1.2 Password Erasure and Modification**

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Both the user and supervisor passwords can be erased if they are no longer needed. A new password can be entered only if the old one is erased. Holds down button 3 and the enter button together for more

than 5 seconds to enter the erasing user password mode, after key in the user or supervisor password, and enter button, user password will be erased. This feature is made to guarantee the supervisor can always change the user password without knowing the user password. A new user password can be entered if desired.

Hold down button 4 and the enter button together for more than 5 seconds to enter the erasing supervisor password mode, after the supervisor password is entered, supervisor password will be erased. A new supervisor password can be entered if desired.

Upon entering any erasing or entering mode, LED will start blinking (ESCAPE timer will start as well) until enter button is pressed. If wrong password is entered, LED will start blinking in Red color. Whenever any button entering sequence is started, ESCAPE timer starts to count. ESCAPE timer can be reset by any button is pressed. For any reason the user can not finish the entering sequence before ESCAPE timer is expired, security mode will go back to previous state. In entering or erasing password mode, security mode will terminate the sequence, then goes back to previous state.

## **4.1.2 Operation instruction**

### **4.1.2.1 Create User/Supervisor password :**

---

1. Power on system
2. Hold down button 1 and enter button together for more than 5 seconds for creating User Password; hold down button 2 and enter button together for more than 5 seconds for creating Supervisor Password, LED will start b linking until enter button is pressed.
3. Press button #1~4 to enter your password, then press "**Enter**" key to create password.

### **4.1.2.2 Erase User/Supervisor password:**

---

1. Power on system and enter your password.
2. Hold down button 3 and the enter button together fo r more than 5 seconds for erasing User Password; Hold down button 4 and the

enter button together for more than 5 seconds for erasing Supervisor Password, LED will start blinking until enter button is pressed.

3. Press button #1~4 to enter your password, then press "**Enter**" key to erase password.

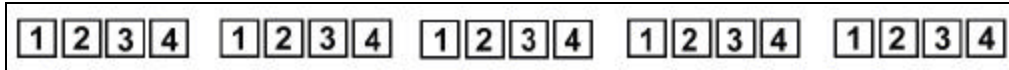


1. If you do not set security password, you can power on system by press power button and boot up your system directly.
2. After password is created, when the system is on, the LED will blink with Green color, system will enter security mode as long as a valid password is found, you have to enter the correct password and Enter button to boot up your system.
3. If you fail to enter the correct password 3 times continually, the LED will blink with Red color and system is remaining locked. When the Red LED blink, password enter is still possible, if you press the correct password, system will boot up and LED will be turned off.
4. If you press the power button and do not press password for 30 seconds, the LED will turn off. You have to remove any power source (AC Adaptor & Battery) for about 1 minute then plug-in power source; press power button again and press correct password to boot up your system.
5. Please keep your password in your mind and don't forget the password.
6. Please don't forget to press the Enter key when you create/erase your password, if you do not press Enter key, system will not take any affect.
7. If you forget your Supervisor password, unfortunately, you have to replace the motherboard or send back your system to repair.

### 4.1.3 Key combination

This security function allows you to protect your personal notebook's information than ever. We provide this function with multiple degrees to setup password. At most, there are five degrees. That means you can set single key or combination keys for every degree. Refer to the

picture below to reference.



#### 4.1.3.1 Single Key

The password allows to created as single key, it could be one key, two keys, three keys, four keys or five keys. For this example, you can just push on key#1 then push on **Enter** key, or "1", "2" or "1" "2" "3" or "1" "2" "3" "4" "1" then push on **Enter** to create password.

#### 4.1.3.2 Combination Key

You can set your password with combination key for every degree. For example, you can push on "1+2", "2+3", "3+4", "1+3", "2+4" then push on **Enter** key or "1" "1+2" "1+2+3" "1+2+3+4" "1+2" or any possible combination password you like to create.

You can also create password such as "1+2" or "1+2+3" or "1+2+3+4" then push on " **Enter**" to create your own password.



Please set your password very carefully, we recommend you try to press these buttons before you set the password. If you set your password as combination key, you have to press these keys simultaneous for every degree. Please consider whether your fingers can fit in with the space for the buttons and whether you can press your combination key simultaneous. Otherwise, maybe you can set your own password but you can't press them simultaneous when you shutdown system and try to power on your system.

## 4.2 Firmware Security (OBP)

### 4.2.1 Security Mode Commands

<b>full</b>	All commands except for "go" require the password.
<b>command</b>	All commands except for "boot" and "go" require the password.



none

No password required (OBP default Setting).

#### 4.2.1.1 Command Security

With security -mode set to command:

- A password is not required if you type the boot command by itself. However, if you use the boot command *with an argument*, a password is required.
- The go command never asks for a password.
- A password is required to execute any other command.

Examples are shown in the following screen.

```
ok
boot (no password required)
ok go (no password required)
ok boot filename (password required)
Password: (password is not echoed as it is typed)
ok reset-all (password required)
Password: (password is not echoed as it is typed)
```



**Caution**

It is important to remember your security password and to set the security password *before* setting the security mode. If you forget this password, you cannot use your system; you must call your vendor's customer support service to make your machine bootable again.

To set the security password and command security mode, type the following at the

```
ok prompt:
ok password
ok New password (only first 8 chars are used):
ok Retype new password:
ok setenv security-mode command
ok
```

The security password you assign must be between zero and eight characters. Any characters after the eighth are ignored. You do not have to reset the system; the security feature takes effect as soon as

you type the command.

If you enter an incorrect security password, there will be a delay of about 10 seconds before the next boot prompt appears.

#### **4.2.1.2 Full Security**

---

The full security mode is the most restrictive. With security-mode set to full:

- A password is required any time you execute the boot command.
- The go command never asks for a password.
- A password is required to execute any other command.

Here are some examples.

```
ok go (no password required)
ok boot (password required)
Password: (password is not echoed as it is typed)
ok boot filename (password required)
Password: (password is not echoed as it is typed)
ok reset-all (password required)
Password: (password is not echoed as it is typed)
```

To set the security password and full security, type the following at the ok prompt:

```
ok password
ok New password (only first 8 chars are used):
ok Retype new password:
ok setenv security-mode full
ok
```

## **4.3 Software Security (Solaris)**

### **4.3.1 Setting Superuser Password**

---

Each Solaria 650 must create super user password at the first start, Solaris will bring system to Initial System Configuration, the last step will need to enter superuser (root) password as below. Follow the on-screen instruction to create your superuser (root) password.

On this screen you can create a root password.  
A root password can contain any number of characters, but only the first eight characters in the password are significant. (For example, if you create 'a1b2c3d4e5f6' as your root password, you can use 'a1b2c3d4' to gain root access.)  
You will be prompted to type the root password twice; for security, the password will not be displayed on the screen as you type it.

> If you do not want a root password, press RETURN twice.

Root password:

Re-enter your root password.

Press Return to continue.

System identification is completed.

rebooting system due to change(s) in /etc/default/init

Jul 30 17:19:32 rpcbind: rpcbind terminating on signal.

syncing file systems... done

rebooting...

Resetting ...



- Superuser passwords must be kept secret and known only to administrator. Each user account should be assigned a password, which is a combination of six to eight letters, numbers, or special characters. You can set a user's password when you create the user account and have the user change it when logging in to a system for the first time.
- To make your computer systems more secure, ask users to change their passwords periodically. For a high level of security, you should require users to change their passwords every six weeks. Once every three months is adequate for lower levels of security. **System administration logins (such as root and sys) should be changed monthly, or whenever a person who knows the root password leaves the company or is reassigned.**

#### 4.3.2 How to change Password

In order to change superuser password, you have to become a superuser (root) then you can change superuser password.

- **Become superuser by one of the following methods. Both methods require that you know the root password.**
  1. Change to the superuser account by using the su command.

% **su**

Password: *root\_password*

#

2. Log in as superuser on the system console.

hostname console: **root**  
Password: *root\_password*

#

The pound sign (#) is the Bourne shell prompt for the superuser account.

- **Change superuser (root) password by "passwd" command**

#passwd

passwd: Changing password for root

New password: (Enter new password)

Re-enter new password: (Enter new password again)

Passwd (SYSTEM): passwd successfully changed for root

#



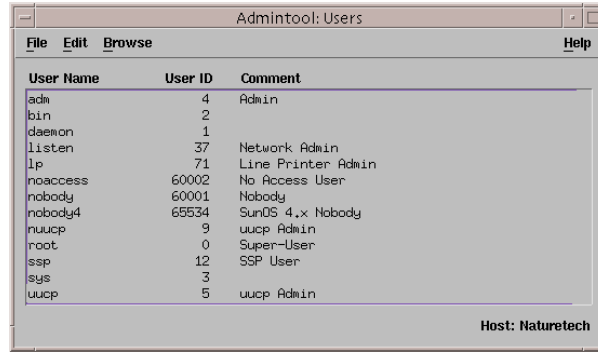
New superuser (root) will be valid if you logged out Solaris. You must logged out Solaris activate new superuser password.

#### **4.3.3 Administer Passwords**

You can use Admintool for password administration, which includes specifying a normal password for a user account, enabling users to create their own passwords during their first login, disabling or locking a user account, or specifying expiration dates and password aging information.

Admintool can only be use in the CDE session. Follow the instruction to use "Admintool":

1. Log in Solaris as root and enter superuser (root) password. Log in the CDE session.
2. Push on the right mouse button and select "**Tools**" then select "**Admintool**". The picture below will appear.



- Click on the "Browse" item and select "Users", click on the "Edit" item then select "Add", the task as picture below will appear. In order to manage the user account group, you can refer to "system administration guide", the document could be found at: docs.sun.com

**Admintool: Add User**

**USER IDENTITY**

User Name:

User ID:

Primary Group:

Secondary Groups:

Comment:

Login Shell: Bourne  /bin/sh

**ACCOUNT SECURITY**

Password:

Min Change:  days

Max Change:  days

Max Inactive:  days

Expiration Date:     
(dd/mm/yy)

Warning:  days

**HOME DIRECTORY**

Create Home Dir: ☐

Path:

OK Apply Reset Cancel Help



Many breaches of computer security involve guessing a legitimate user's password. You should make sure that users avoid using proper nouns, names, login names, and other passwords that a person might guess just by knowing something about the user.

Good choices for passwords include:

- Phrases
- Nonsense words made up of the first letters of every word in a phrase
- Words with numbers or symbols substituted for letters (b00k for book)

Do not use these choices for passwords:

- Your name, forwards, backwards, or jumbled
- Names of family members or pets
- Car license numbers
- Telephone numbers
- Social Security numbers
- Employee numbers
- Names related to a hobby or interest
- Seasonal themes, such as Santa in December Any word in the dictionary

## ***Chapter 5 System Software Interface***



***Solaris Operating Environment  
Language Versions***



The Solaria 650 runs the Solaris Operating Environment. This chapter describes the Solaris Operating Environment software package. Solaris Operating Environment software and applications will be bundled (Pre-install Solaris 8 04/01 or later version) with Solaria 650.

## **5.1 Solaris Operating Environment**

The Solaria 650 requires the following software:

- Solaris™ 8 04/01 package or a subsequent compatible version.
- The latest OpenBoot™ PROM (OBP) compatible with your Solaris operating environment. The Solaria 650 is shipped with the version of OBP available at the time of manufacture (version 4.0.10). The OBP might be out of date by the time you get this notebook. Please check the following web site for information on the latest OBP for your operating environment. <http://www.gosignal.com>

If you cannot access the web site, contact your local distributor to obtain the latest OBP.

---

### 5.1.1 Checking the Solaris Operating Environment Version

---

At the UNIX prompt enter the following command:

```
showrev
```

You will see something like this:

```
Hostname: xxxx
```

```
Hostid: xxxx
```

```
Release: 5.8
```

```
Kernel Architecture: sun4u
```

```
Application Architecture: sparc
```

```
Hardware provider: Sun_Microsystems
```

```
Domain:
```

```
Kernel version: SunOS 5.8 Generic 108528-09 June 2001
```

Please note, xxxx are don't care since they are system specific.

---

### 5.1.2 Checking the OBP Version

---

#### **OBP**

To determine the installed OBP version, enter the following command at the OK prompt

```
ok .version
```

```
Firmware CORE Release 1.0.7 created 2001/6/6 22:28
```

```
Release 4.0.2 Version 10 created 2001/09/28 17:24<---- OBP version 4.0.2
```

```
cPOST version 1.0.4 created 2001/4/27
```

```
CORE 1.0.7 2001/06/06 22:28
```

---

#### **Solaris™ Operating Environment**

Perform the procedure below at the shell prompt:

```
#prtconf -V
```

The system will display:

```
OBP 4.0.10 2001/09/28 17:24
```

---

## **5.2 Language Versions**

English  
French  
German  
Italian  
Spanish  
Swedish  
Simplified Chinese  
Traditional Chinese  
Japanese  
Korean

## ***Chapter 6 I/O & Connector Definition***

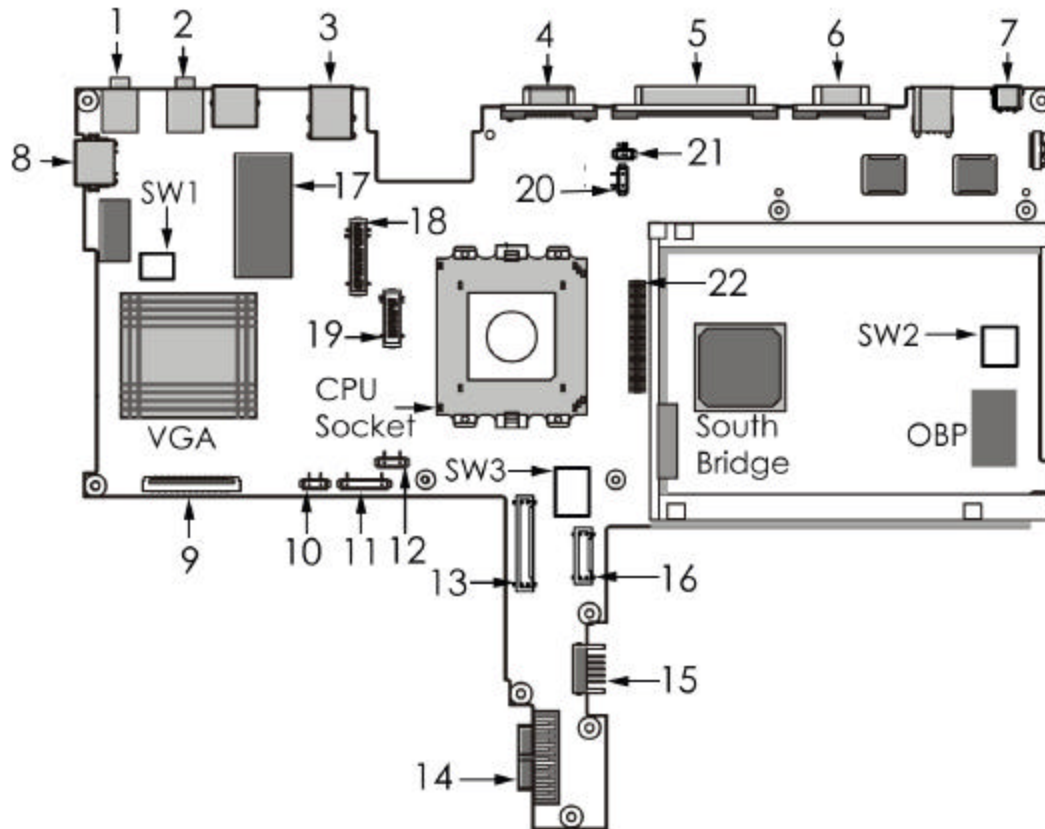


***The Front View of Solaria 650 Motherboard***  
***The Opposite View of Solaria 650 Motherboard***

SiGNAL Computer Products, Inc.  
550 Newtown Road Littleton MA 01460  
Tollfree: 800-228-8781 Fax: 978-952-8181  
[Support@gosignal.com](mailto:Support@gosignal.com)  
Copyright 2003

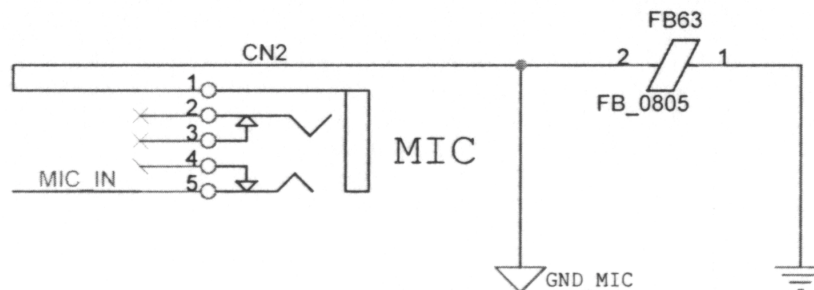
This chapter provides motherboard information for Solaria 650. Also provided are the illustrations and locations of connectors, I/O port, key components and switches

## 6.1 The front view of Solaria 650 motherboard



### 1. Microphone-in Jack (CN2)

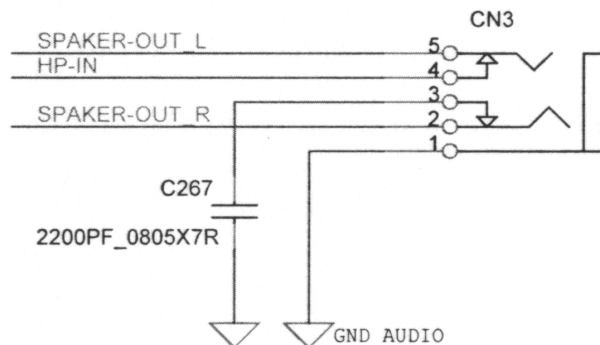
## MIC IN JACK



### 2. Line-out Jack (CN3)

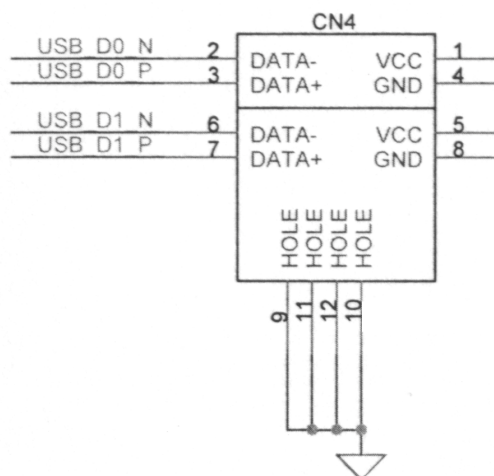


## LINE OUT JACK

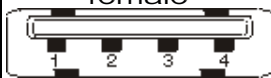


### 3. USB Port (CN4)

## USB CONNETTOR

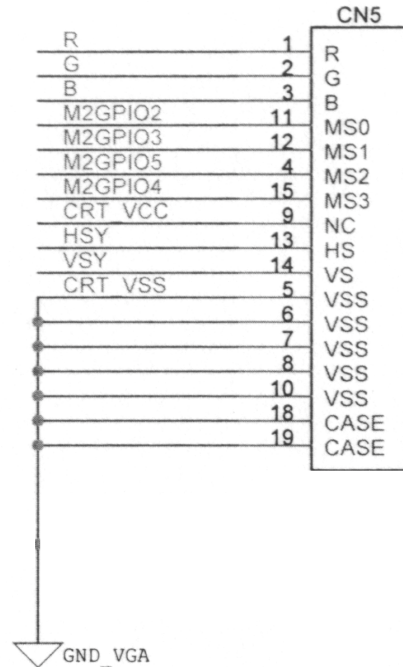


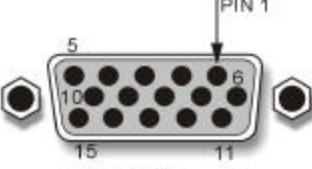
Connector	Pin	Signal	Pin	Signal
Mating face of USB type A female	1	+5V	3	Data+
	2	Data-	4	GND



#### 4. CRT Port (CN5)

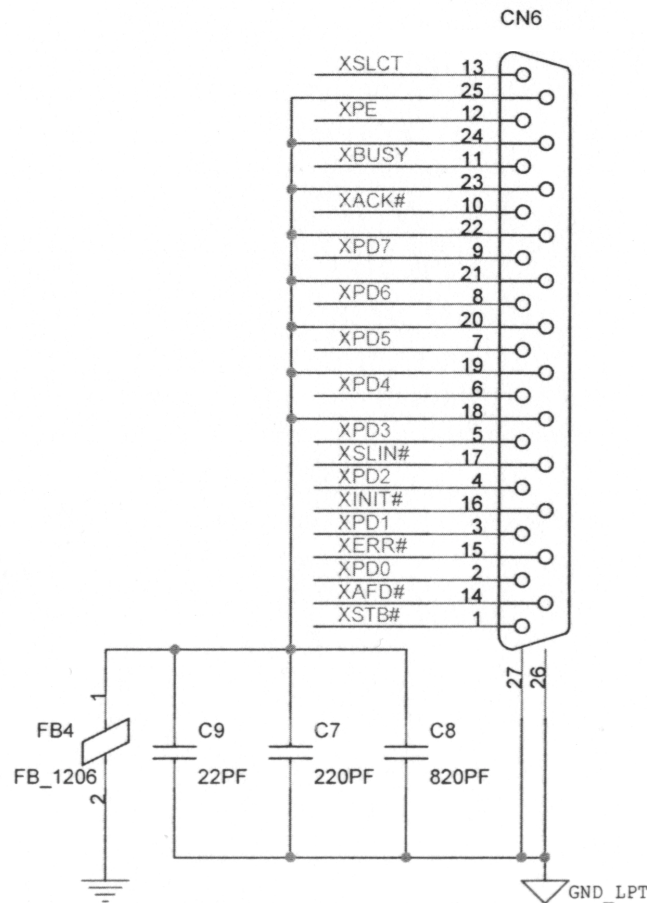
### CRT PORT

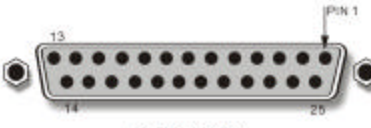


Connector	Pin	Signal	Pin	Signal
 DB-15F (Female)	1	RED	9	Not Connected
	2	GREEN	10	Signal Ground
	3	BLUE	11	DISPLAYID(0)
	4	DISPLAYID(2)	12	DISPLAYID(1)
	5	Signal Ground	13	HSYNC
	6	Signal Ground	14	VSNC
	7	Signal Ground	15	DISPLAYID(3)
	8	Signal Ground		

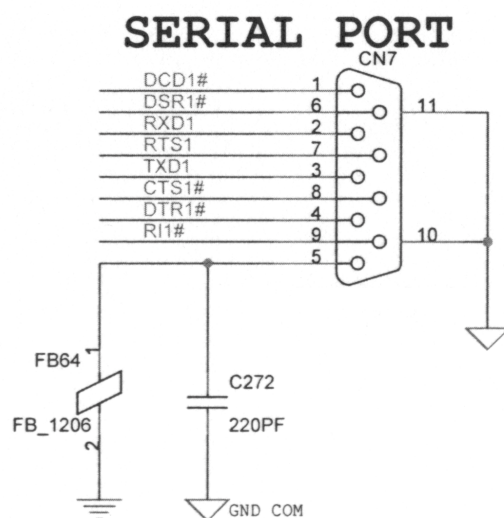
## 5. Parallel Port (CN6)


### PARALLEL PORT



Connector	Pin	Signal	Pin	Signal
 <p>DB-25F (Female)</p>	1	PTRSTB	14	PTRAFFD
	2	PTRD0	15	PTERRR
	3	PTRPD1	16	PTRINIT
	4	PTRPD2	17	PTRSLIN
	5	PTRPD3	18	GND
	6	PTRPD4	19	GND
	7	PTRPD5	20	GND
	8	PTRPD6	21	GND
	9	PTRPD7	22	GND
	10	PTRACK	23	GND
	11	PTRBUSY	24	GND
	12	PTRPE	25	GND
	13	PTRSLCT		

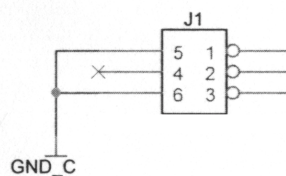
## 6. Serial Port (CN7)




Connector	Pin	Signal	Pin	Signal
 DB-9M(Male)	1	DCD	6	DSR
	2	RXD	7	RTS
	3	TXD	8	CTS
	4	DTR	9	RI
	5	GND		

## 7. DC-in Jack (J1)

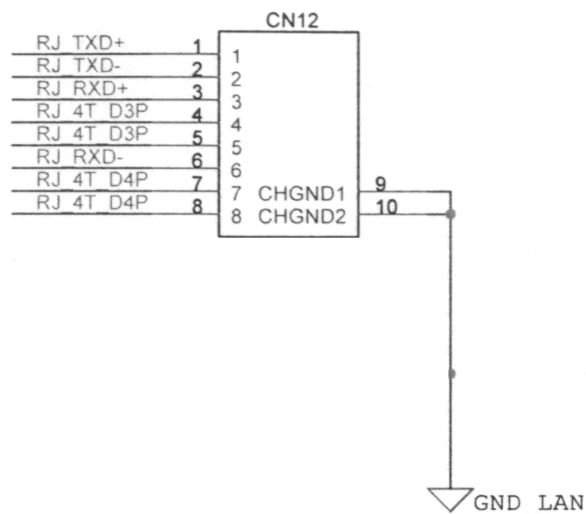
### ADPT CONNETTOR




Connector	Pin	Signal	Pin	Signal
	1	GND	3	DC 15V
	2	GND		

## 8. Ethernet Port (CN12)

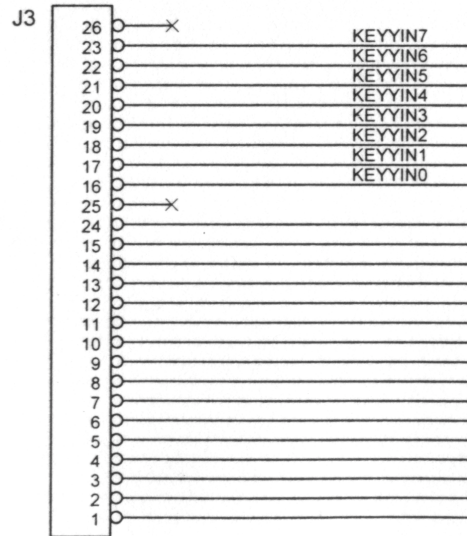
### ETHERNET



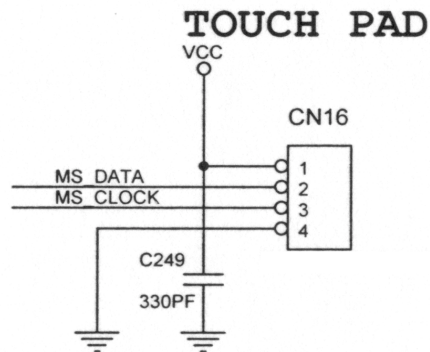
Connector	Pin	Signal	Pin	Signal
	1	TXD+	5	4T_D3P
	2	TXD-	6	RXD_
	3	RXD+	7	4T_D4P
	4	4T_D3P	8	4T_D4P

## 9. Keyboard Connector (J3)

## INT KEYBOARD

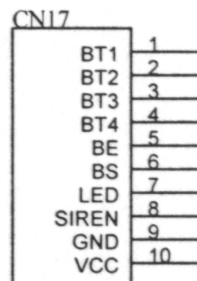


## 10. Touchpad Connector (CN16)



## 11. Security Connector (CN17)

### SECURITY

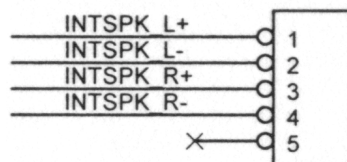


## 12. Speaker Connector (CN15)



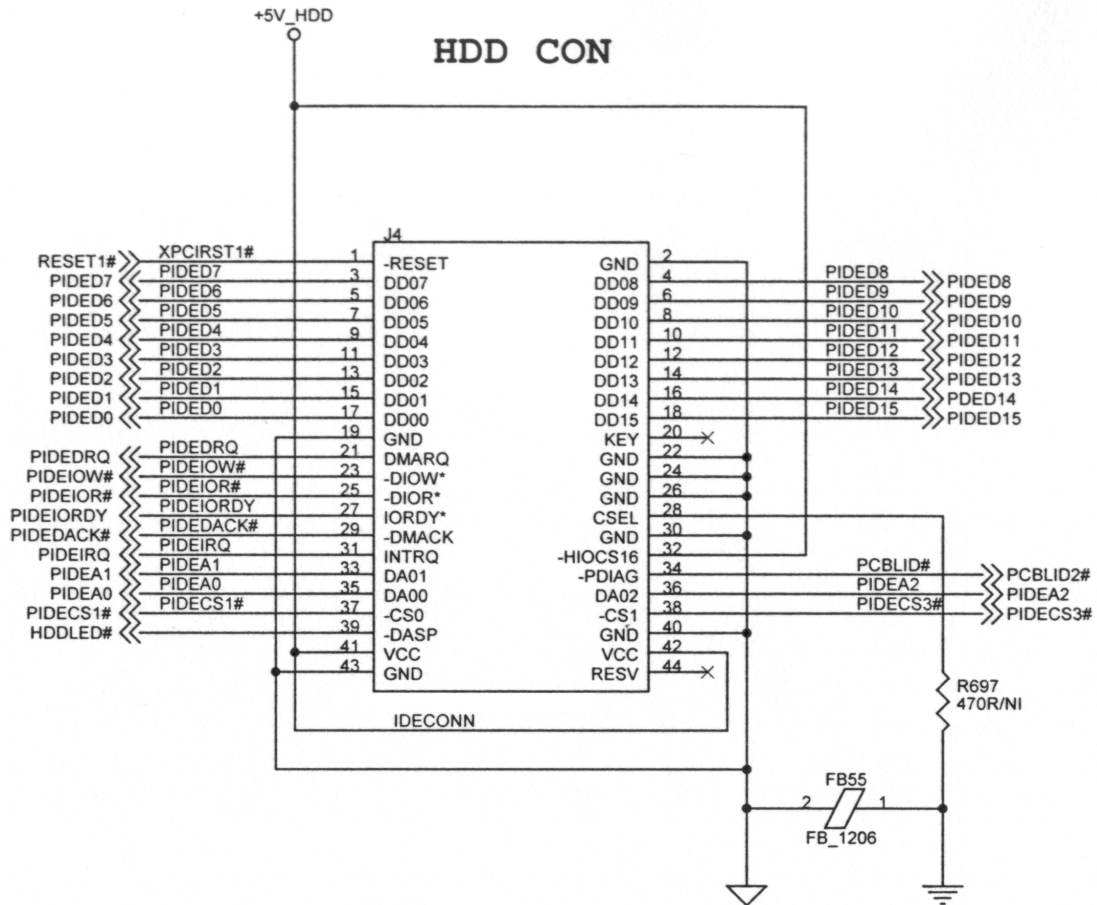
## INT AUDIO

CN15

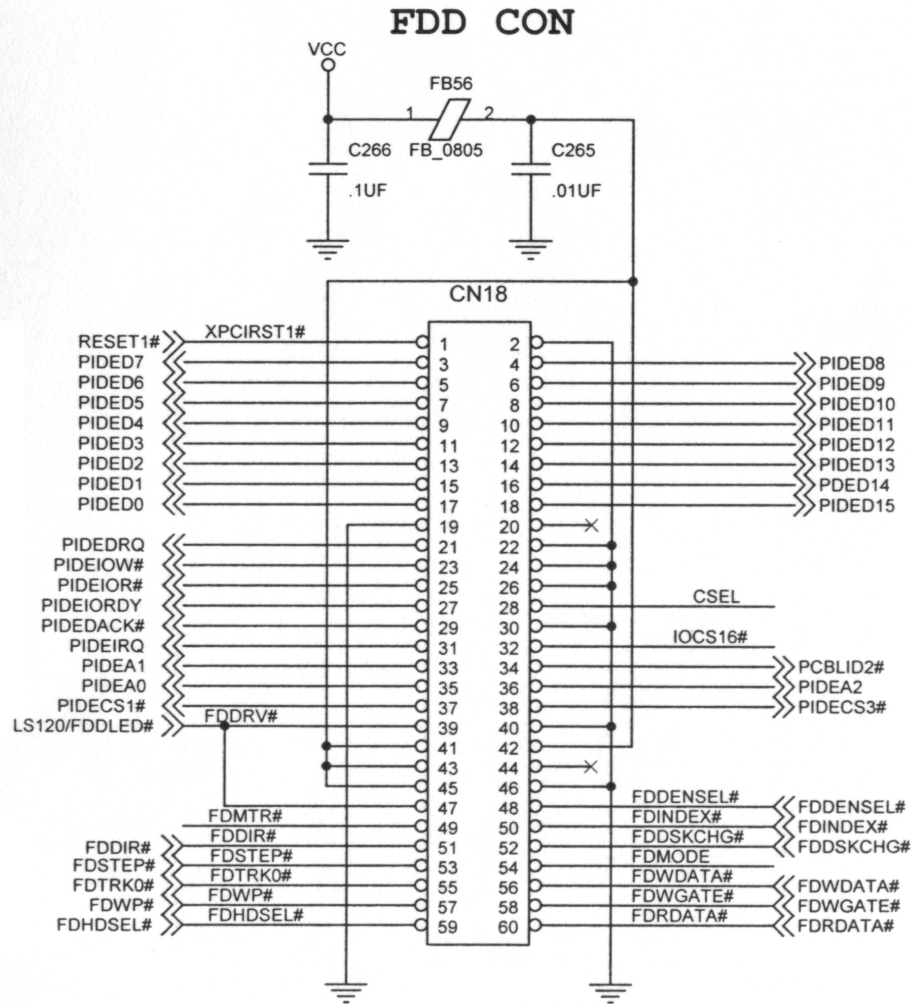


### 13. Primary IDE-Hard Drive Connector (J4)

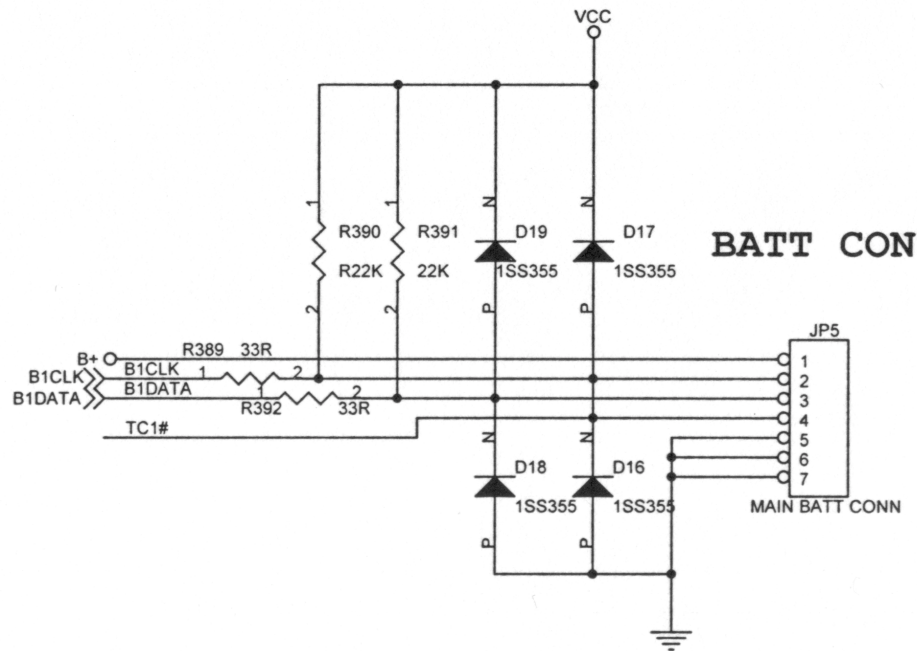
---



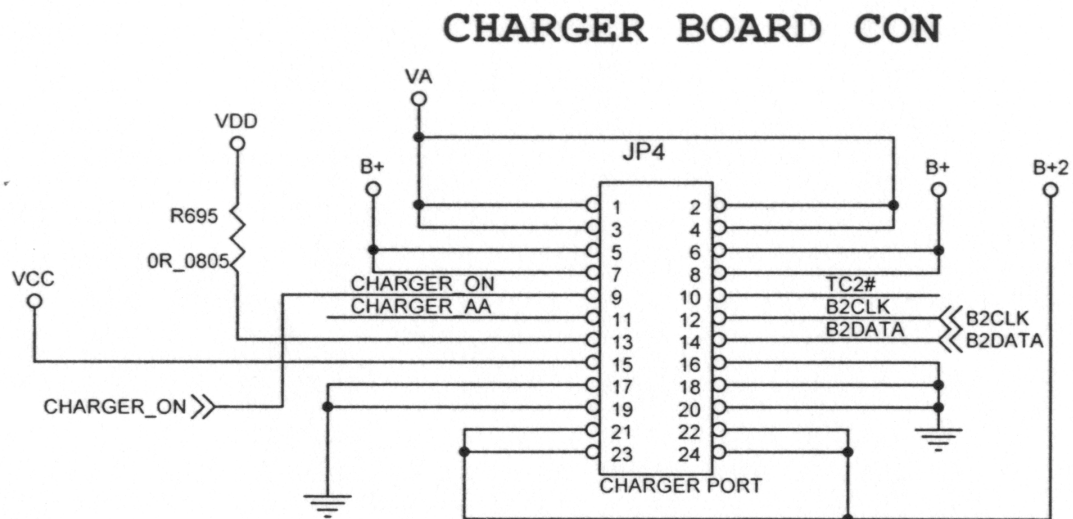
## 14. Floppy Connector (CN18)



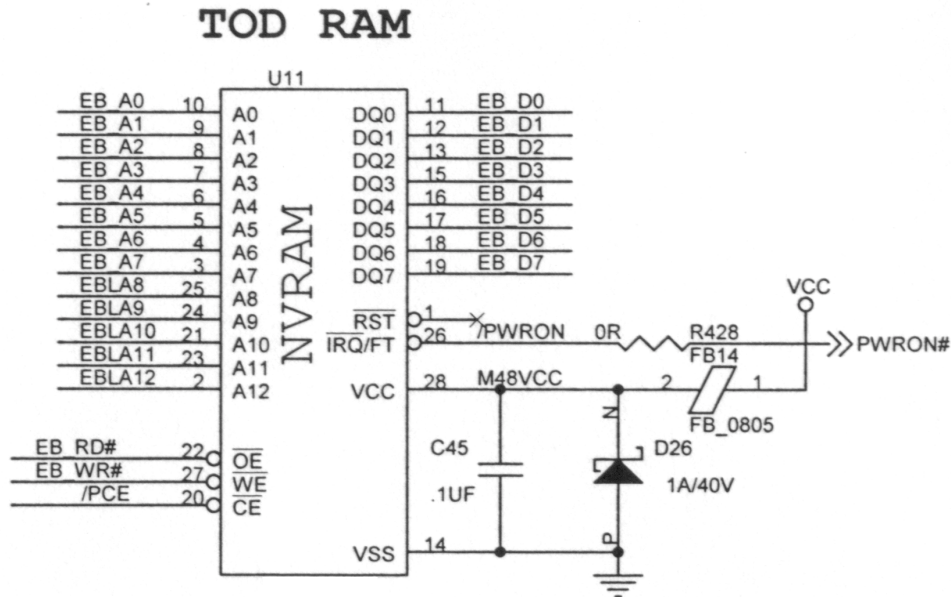
## 15. Battery Connector (JP5)



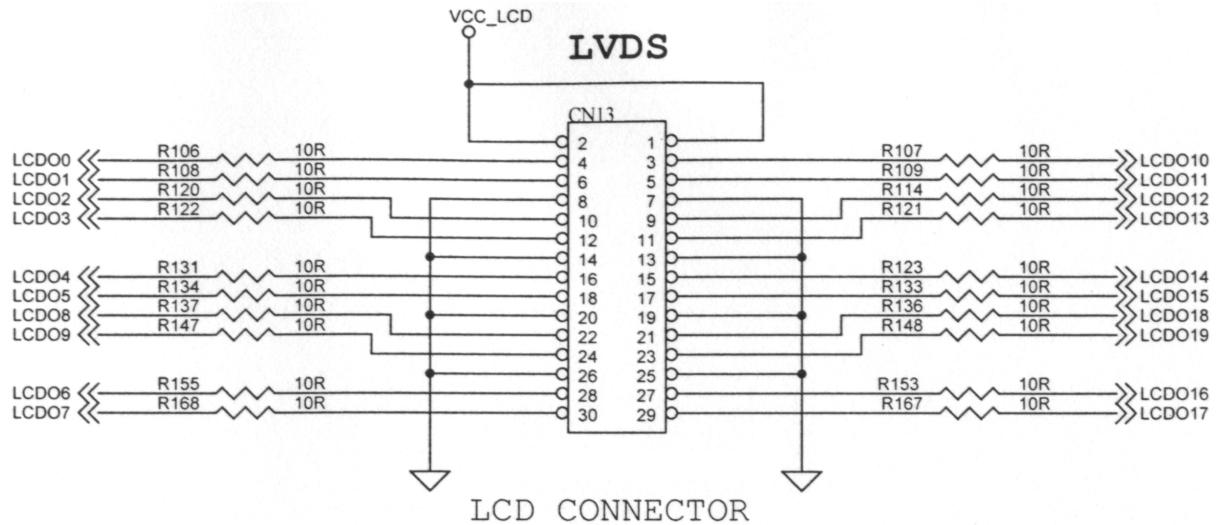
## 16. Charger Board Connector (JP4)



## 17. NVRAM Connector (U11)



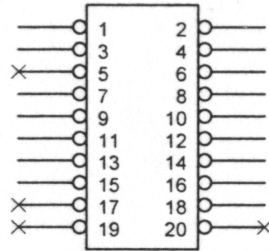
## 18. LCD Cable Connector (CN13)



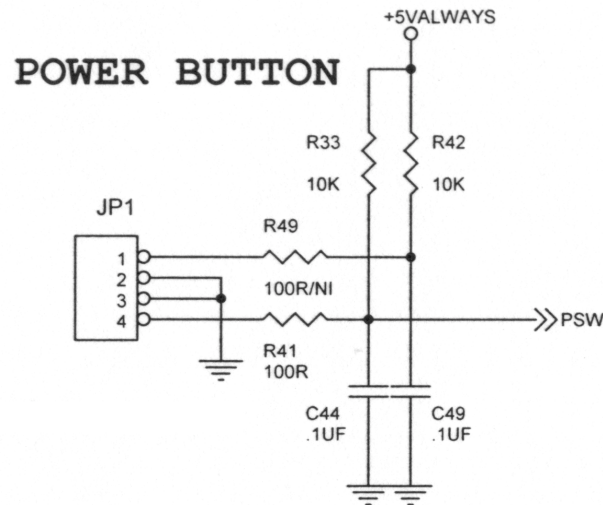
## 19. Inverter Connector (CN14)

### PANEL POWER

CN14



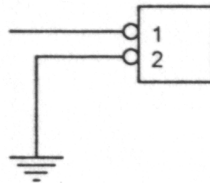
## 20. Power Switch Connector (JP1)



## 21. Fan Connector (CN11)

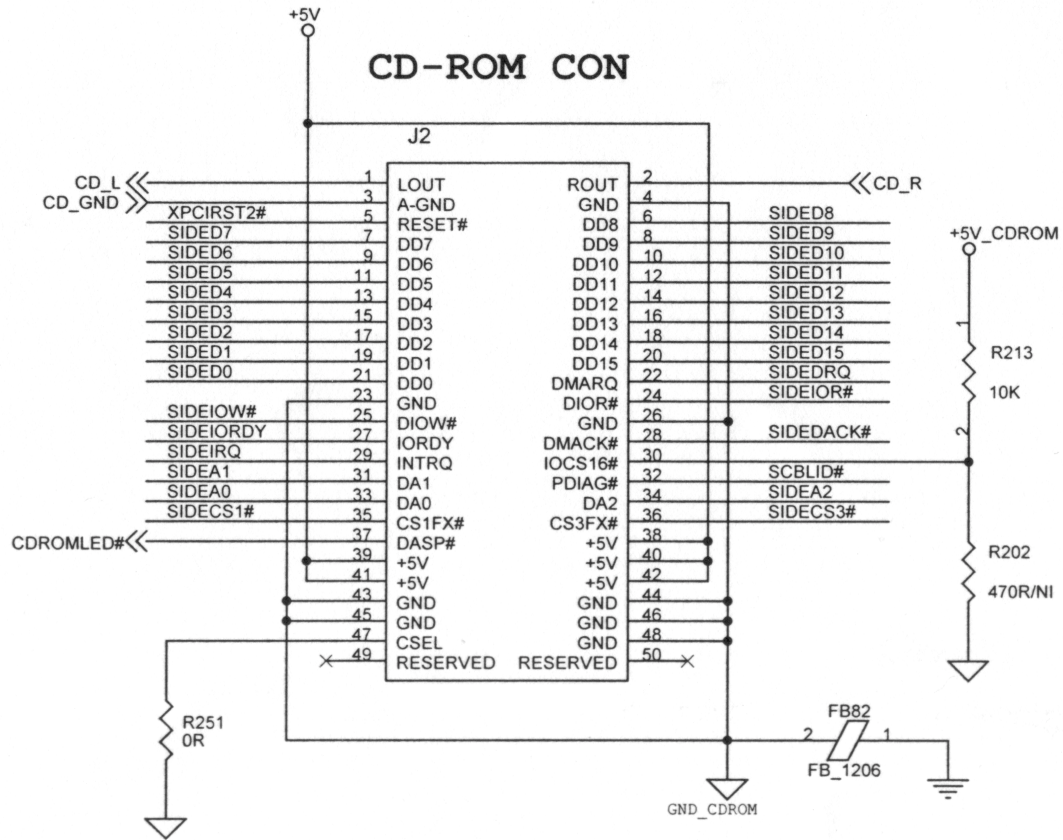
### CPU FAN

CN11

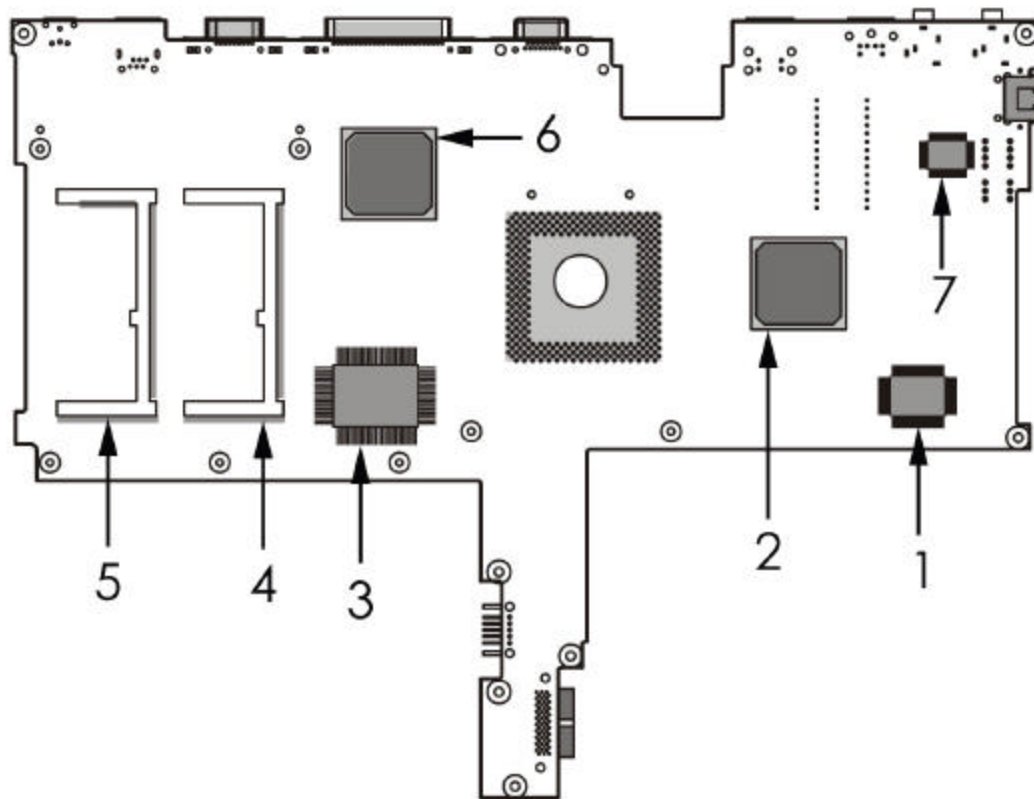




## 22. Secondary IDE-DVD-ROM Connector (J2)



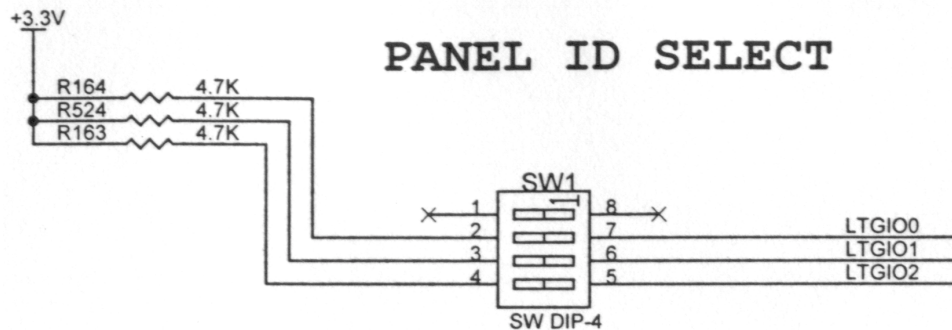
## 6.2 The Opposite view of Solaria 650 motherboard



1. Keyboard/Touchpad Controller (U66)
2. APB (U63)
3. I-Chip (U69)
4. DIMM1
5. DIMM2
6. RIO (U60)
7. PHY (U58)

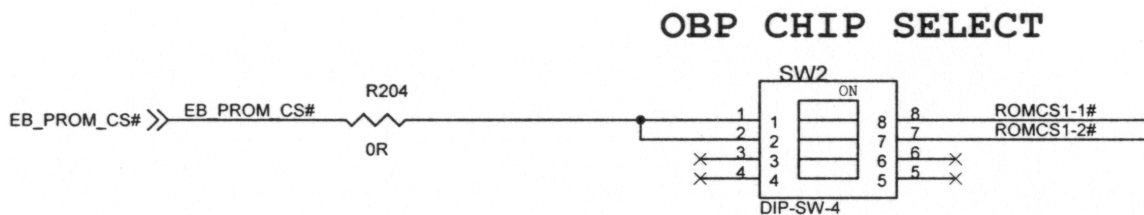
## 6.3 Switch Definition

### SW1



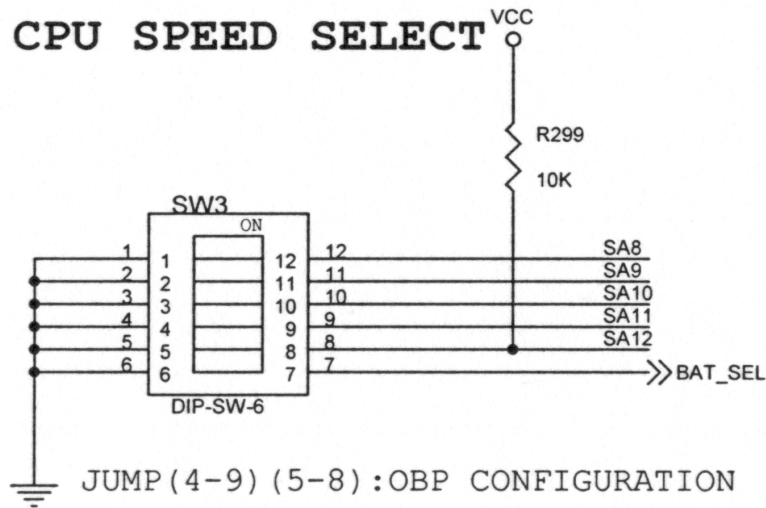
2-7	3-6	4-5	PANEL ID
ON	OFF	ON	1024X768
OFF	ON	OFF	1400X1050

### SW2



1-8	2-7	ROM CHIP SELECT
ON	OFF	ON BOARD OBP
OFF	ON	ROM SIMULATOR

## SW3



### CPU SPEED DETECT

1-12	2-11	3-10	CPU SPEED
ON	ON	ON	400 MHZ
OFF	ON	ON	450 MHZ
ON	OFF	ON	500 MHZ
OFF	OFF	ON	550 MHZ
ON	ON	OFF	600 MHZ
OFF	ON	OFF	650 MHZ
ON	OFF	OFF	700 MHZ
OFF	OFF	OFF	750 MHZ

### KEYBOARD SELECT

6-7	KEYBOARD SELECT
ON	JAPAN KEYBOARD
OFF	US KEYBOARD



## **Chapter 7 OBP Diagnostics and Update**



***Entering the OpenBoot PROM Environment***

***Returning to OS***

***PROM Contents***

***OBP Version and Update***

***Determining OBP Version***

***Updating OBP***

***Power-on Self Test (POST)***

***Obdiag***

***Basic OBP Command***



This chapter provides information on the Solaria 650 system firmware. The system firmware is resident on the Solaria 650. It provides hardware testing and initialization prior to booting. The firmware also enables booting from a wide range of devices. It includes the firmware CORE (Common Operations & Reset Environment), OpenBoot™ firmware (OBP), power-on self test (POST), and the OpenBoot diagnostic (OBdiag).



POST consists of two parts:

- bPOST
- cPOST

The bPOST (basic POST) is built into the CORE. It provides basic diagnostics for NVRAM, MMUs, caches, FPU, and memory.

The cPOST (comprehensive POST) contains diagnostics for the on-board devices like PBM, RIO, South Bridge, and memory DMA test.

## 7.1 Entering the OpenBoot PROM Environment

Pressing the  +  + A key on the keyboard during the boot up process or from the operating system after the system has already booted.



Distributor or reseller may enter the OpenBoot environment to change configurations. Avoid providing the information to end-users who may risk corrupting the software package.

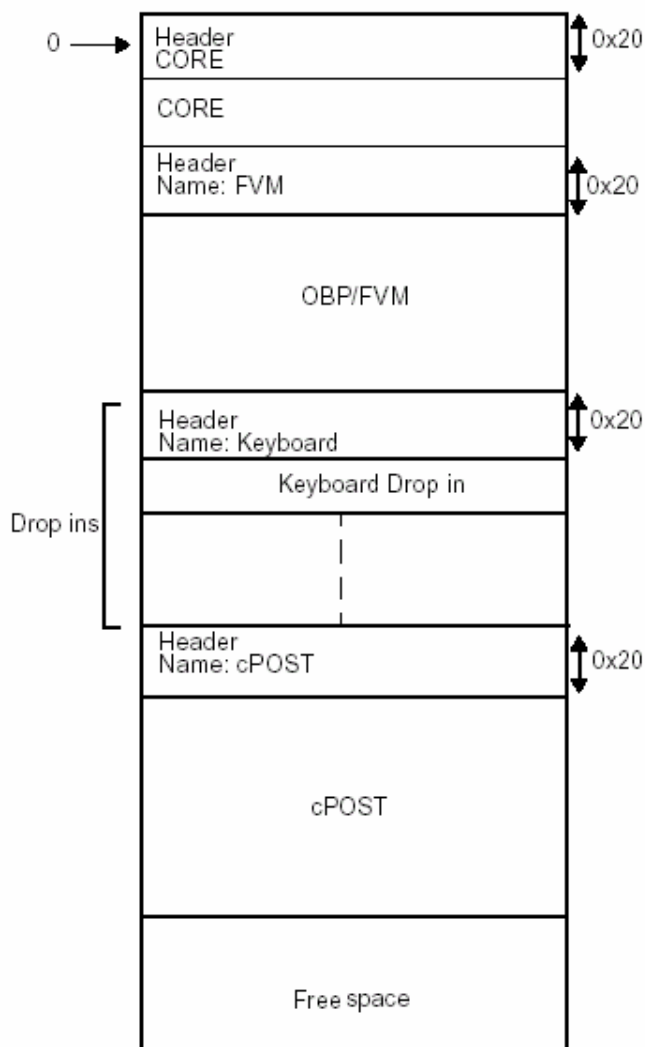
## 7.2 Returning to OS

To return to OS environment, enter the following command at the ok prompt:

**Go**

## 7.3 PROM Contents

The 1 MByte flash PROM (OBP) device for the Solaria 650 contains boot up and self-test code. This boot up ROM contains the CORE, OBP and POST code



## 7.4 OBP Version and Update

This section describes how to determine the current installed version of the OBP and how to update OBP.

## 7.5 Determining OBP Version

### 7.5.1 If Running OBP

To determine the installed OBP version, enter the following command at the ok prompt.

```
ok .version
Firmware CORE Release 1.0.7 created 2001/6/6 22:28
Release 4.0.2 Version 10 created 2001/09/28 17:24<---- OBP version 4.0.2
cPOST version 1.0.4 created 2001/4/27
CORE 1.0.7 2001/06/06 22:28
```

### 7.5.2 If Running Solaris Operating Environment

Perform the procedure below at the <machine\_name> prompt:

**#prtconf -V**

The system displays something like the following:

**OBP 4.0.10 2001/09/28 17:24**

## 7.6 Updating OBP

This section describes how to update OBP (and POST).

Updating OBP in the Solaris OS

- 1. Download Update ROM files and utility, which is a C shell executable file that includes the OBP 4.0.x Flash PROM image and the automatic update of the flash content.**
- 2. Become super user.**
- 3. Change executes permissions of the downloaded file if necessary.**
- 4. Execute the downloaded script file, answer prompts as appropriate.**
- 5. After completion of script, OBP will be upgraded in flash PROM.**

The upgraded OBP will take effect the next time the system is rebooted, reset or power cycled.

## **7.7 Power-on Self Test (POST)**

POST consists of the following two parts:

- bPOST
- cPOST

POST tests on-board system resources that are necessary for firmware to execute and boot Solaris. POST is the diagnostic part of the firmware that is executed to test the functionality of some of the on-board components such as the CPU, memory, cache, PCI Bridge. If the OS is not booted or any of the devices do not work properly, it displays the error messages on the screen.

The goal of POST is to execute a predefined sequence of diagnostic tests to determine the basic reliability of the system, the processor, and the memory. A majority of hardware component faults can be detected by POST.

The minimum requirements to run POST on the Solaria 650 are:

- Host system
- Serial cable for serial link between the two systems

### **7.7.1 OBP Boot-up Messages**

---

The following are the OBP boot-up messages that appear on the screen.

Processor Speed = 650 MHz

Firmware CORE Sun Microsystems, Inc.

@(#) core 1.0.7 2001/06/06 22:28

Hardware Power ON

Verifying NVRAM...Done

MCR0 = 56a0bc04

MCR1 = c0804000

MCR2 = f3300ee

MCR3 = df

Ecache Size = 256 KB

NVRAM Test

Icache Test  
Dcache Test  
MMU Test  
FPU Test  
Ecache Tag Addr Test  
Ecache RAM Addr Test  
Clearing E\$ Tags Done  
Clearing I/D TLBs Done  
Probing memory  
Done  
MEMBASE=0x20000000  
MEMSIZE=0x20000000  
Data Line Test  
Core Memory Test  
Clearing memory...including Unix retained memory...Done  
Turning ON MMUs Done  
Copy ROM to RAM (168344 bytes) Done  
Orig PC=0x1fff0008988 New PC=0xf0f089e0  
Processor Speed=650MHz  
Memory Data Line Test  
Memory Addr Line w/ Ecache Test  
ECC Block Memory Test  
Looking for Dropin cPOST ... found  
Copying Client...Done  
Transferring control to Client...

Sun Microsystems, Inc. cPOST  
@(#) cpost 1.0.4 2001/04/27 00:42

#### All Basic UltraSPARC III PBM Tests

- Init CPU PBM
- PIO Decoder And BCT Test
- CPU IOMMU Reg Test
- CPU IOMMU RAM NTA Test
- CPU IOMMU CAM NTA Test
- CPU IOMMU RAM Address Test
- CPU IOMMU CAM Address Test
- IOMMU TLB Compare Test
- IOMMU TLB Flush Test
- PBM Control/Status Reg Test
- PBM Diag Reg Test

CPU PBM Reg Test

All Basic RIO Tests (RIO# 1)

- RIO Ebus Config Space Reg Test
- RIO Network Config Space Reg Test
- RIO Firewire Config Space Reg Test
- RIO USB Config Space Reg Test

Basic SouthBridge Tests

- Southbridge ISA Config Space Reg Test
- Southbridge PMU Config Space Reg Test
- Southbridge IDE Config Space Reg Test
- Southbridge Audio Config Space Reg Test

All Memory Stress Tests

- Consist Write Data Test

Resetting...

Processor Speed = 650 MHz

Firmware CORE Sun Microsystems, Inc.

@(#) core 1.0.7 2001/06/06 22:28

Software Power ON

Verifying NVRAM...Done

MCR0 = 56a0bc04

MCR1 = c0804000

MCR2 = f3300ee

MCR3 = df

Ecache Size = 256 KB

Clearing E\$ Tags Done

Clearing I/D TLBs Done

Probing memory

Done

MEMBASE=0x20000000

MEMSIZE=0x20000000

Clearing memory...Done

Turning ON MMUs Done

Copy ROM to RAM (168344 bytes) Done

Orig PC=0x1fff0008988 New PC=0xf0f089e0

Processor Speed=650MHz

Looking for Dropin FVM ... found

Decompressing Client Done

Transferring control to Client...

```
ttya initialized
Reset Control: BXIR:0 BPOR:0 SXIR:0 SPOR:1 POR:0
Probing upa at 1f,0 pci pci pci
Probing upa at 0,0 SU NW,UltraSPARC-III SUNW,UltraSPARC-III (256 Kb)
Loading Support Packages: kbd-translator
Loading onboard drivers: ebus flashprom eeprom idprom
Probing Memory Bank #0 512 Megabytes
Probing Memory Bank #1 512 Megabytes
Probing Memory Bank #2 0 Megabytes
Probing Memory Bank #3 0 Megabytes
Probing for User PROMs: flashprom flashprom
Probing /pci@1,1 Device 7 isa dma floppy parallel power serial serial
Probing /pci@1,1 Device c network firewire usb keyboard device 0
    keyboard 1 mouse
Probing /pci@1,1 Device 3 pmu i2c winbond dimm dimm ppm beep
watchdog
Probing /pci@1,1 Device d ide disk cdrom
Probing /pci@1,1 Device 2 ATY,RageM1
Probing /pci@1,1 Device 8 sound

SiGNAL Solaria 650 (UltraSPARC-III 650MHz), Keyboard Present
OpenBoot 4.0.2.10 , 1024 MB memory installed, Serial #8388616.
Ethernet address 0:2:11:80:0:8, Host ID: 80800008.

Environment monitoring: disabled

ok
```

## 7.8 obdiag

To launch the obdiag (OBP diagnostics) enter the following command at the ok prompt:

ok **obdiag**

It displays the following main obdiag menu, which allows you to select various obdiag options.



## obdiag Main Menu

The following pages describe various obdiag menus. The obdiag menus offer 16 basic choices for running diagnostics.

o b d i a g		
1 ATY,RageM1@2	2 device@3	3 ebus@c
4 flashprom@10,0	5 flashprom@10,400000	6 flashprom@10,800000
7 floppy@0,3f0	8 ide@d	9 keyboard@0
10 keyboard@2	11 network@c,1	12 parallel@0,378
13 pmu@3	14 serial@0,2e8	15 serial@0,3f8
16 usb@c,3		
Commands: test test-all except help what printenvs setenv versions exit		

obdiag>

### 7.8.1 obdiag Main Menu

Following is a brief description of all the obdiag menu choices:

1. ATY,RageM1@2
2. [device@3](#)
3. ebus@c
4. [flashprom@10,0](#)
5. [flashprom@10,400000](#)
6. flashprom@10,800000
7. [floppy@0,3f0](#)
8. [ide@d](#)
9. [keyboard@0](#)
10. [keyboard@2](#)
11. network@c,1
12. parallel@0,378
13. pmu@3
14. serial@0,2e8
15. serial@0,3f8
16. usb@c,3

Commands: test test-all except help what printenvs setenv version exit

### 7.8.2 Command Description

---

**test** Allows you to specify the menu item from the menu. You can add more items separated by commas.

**test-all** Tests all the devices listed on the main menu.

**except** Tests all the devices in the main menu except the specified device number.

**help** Provides on-line help on a particular topic.

**what** Allows you to inquire about a particular device.

**printenvs** Prints the setting of obdiag related config variables.

**setenv** Sets obdiag related config variables.

**version** Selecting this option displays the obdiag version.

**exit** Choosing this option allows you to exit the obdiag.

#### Using the **test-all** Option

The test-all option allows you to test all the components listed on the main

obdiag menu. If it passes all the tests, a test pass message is displayed on the right side of the screen for that component. If it fails, the failure message is displayed.

Press the Return key to return to the main menu. Press the spacebar to interrupt testing.



If you need to use test-all command, the external Sun USB keyboard must be attached, otherwise, OBP cannot find USB device and will stop testing process.

```

obdiag> test-all
Hit the spacebar to interrupt testing
Testing /pci@1f,0/pci@1,1/ATY,RageM1@2
Display not installed

Test hardware registers - passed Ok
Test RamDAC - passed Ok
Test Frame buffer - passed Ok
..... passed
Testing /pci@1f,0/pci@1,1/usb@c,3/device@3 ..... passed
Testing /pci@1f,0/pci@1,1/ebus@c ..... passed
Testing /pci@1f,0/pci@1,1/ebus@c/flashprom@10,0 ..... passed
Testing /pci@1f,0/pci@1,1/ebus@c/flashprom@10,400000 ..... passed
Testing /pci@1f,0/pci@1,1/ebus@c/flashprom@10,800000 ..... passed
Testing /pci@1f,0/pci@1,1/isa@7/dma@0,0/floppy@0,3f0 ..... passed
Testing /pci@1f,0/pci@1,1/ide@d ..... passed
Testing /pci@1f,0/pci@1,1/usb@c,3/device@3/keyboard@0 ..... passed
Testing /pci@1f,0/pci@1,1/usb@c,3/keyboard@2 ..... passed
Testing /pci@1f,0/pci@1,1/network@c,1 ..... passed
Testing /pci@1f,0/pci@1,1/isa@7/dma@0,0/parallel@0,378 ..... passed
Testing /pci@1f,0/pci@1,1/pmu@3 ..... passed
Testing /pci@1f,0/pci@1,1/isa@7/serial@0,2e8 ..... passed
Testing /pci@1f,0/pci@1,1/isa@7/serial@0,3f8 [Used as Console] .....
..... passed
Testing /pci@1f,0/pci@1,1/usb@c,3 ..... passed

Hit any key to return to the main menu

```

## 7.8.3 Testing Multiple Components

You can run obdiag on selected components by specifying only the tests that you want to run. For example, if you want to run tests 8, 11, and 12, type these numbers at the obdiag prompt and press the Return key. The system will perform diagnostics only on those components.

```

|-----o b d i a g-----|
| 1 ATY,RageM1@2          | 2 device@3          | 3 ebus@c          |
| 4 flashprom@10,0        | 5 flashprom@10,400000 | 6 flashprom@10,800000 |
| 7 floppy@0,3f0          | 8 ide@d            | 9 keyboard@0       |
| 10 keyboard@2           | 11 network@c,1      | 12 parallel@0,378  |
| 13 pmu@3                | 14 serial@0,2e8     | 15 serial@0,3f8    |
| 16 usb@c,3              |                     |                    |
|-----|-----|-----|
| Commands: test test-all except help what printenvs setenv versions exit |
|-----|-----|-----|

obdiag> test 8,11,12
Hit the spacebar to interrupt testing
Testing /pci@1f,0/pci@1,1/ide@d ..... passed
Testing /pci@1f,0/pci@1,1/network@c,1 ..... passed
Testing /pci@1f,0/pci@1,1/isa@7/dma@0,0/parallel@0,378 ..... passed

Hit any key to return to the main menu

```

Configuration variables are used by the OBP code and are stored in NVRAM. The following is a sample of the output when the "**printenv**" command is entered at the ok prompt. The setenv command is used to modify the environment variables.

The boot process is controlled by several variables. The configuration variables that affect the boot process are shown below.

ok printenv

Variable Name	Value	Default Value
ras-shutdown-enabled?	false	false
sys-shutdown-temp	70	70
sys-warning-temp	65	65
cpu-shutdown-temp	85	85
cpu-warning-temp	80	80
env-monitor	enabled	disabled
diag-passes	1	1
diag-continue?	0	0
diag-targets	0	0
diag-verbosity	0	0
keyboard-click?	false	false
keymap		
scsi-initiator-id	7	7
#power-cycles	447	No default
system-board-serial#		No default
system-board-date		No default
ttyb-rts-dtr-off	false	false
ttyb-ignore-cd	true	true
ttya-rts-dtr-off	false	false
ttya-ignore-cd	true	true
ttyb-mode	9600,8,n,1	9600,8,n,1
ttya-mode	9600,8,n,1	9600,8,n,1
pcia-probe-list		
pcib-probe-list	7,c,3,d,2,8	7,c,3,d,2,8
watchdog-timeout	63	63
watchdog-enable?	false	false
mfg-mode	off	off
diag-level	max	max
fcode-debug?	false	false
output-device	screen	screen
input-device	keyboard	keyboard
load-base	16384	16384
auto-boot-retry?	false	false
boot-command	boot	boot



auto-boot?	false	true
watchdog-reboot?	false	false
diag-file		
diag-device	net	net
boot-file		
boot-device	disk net	disk net
local-mac-address?	false	false
net-timeout	0	0
ansi-terminal?	true	true
screen-#columns	80	80
screen-#rows	34	34
silent-mode?	false	false
use-nvramrc?	false	false
nvramrc		
security-mode	none	No default
security-password		No default
security-#badlogins	8	No default
oem-logo		No default
oem-logo?	false	false
oem-banner		No default
oem-banner?	false	false
hardware-revision		No default
last-hardware-update		No default
diag-switch?	true	false
ok		

The OBP configuration for each Solaria 650 would be default value. In order to read POST information, you have to change some settings for the OBP configuration. The following settings have to change:

- auto-boot?
- diag-switch?
- env-monitor

The default value settings for OBP should be auto boot, and disable **env-monitor/diag-switch**. You have to turn these settings on to read POST information from ttya, otherwise Solaria 650 will execute "boot" command automatically and will not output POST information to ttya.



You can enter the ok prompt by pressing the  +  + A key on the keyboard during the boot up process. Use "setenv" to change configuration value.

Change "auto-boot?" value as following operation:

```
ok setenv auto-boot? false
auto-boot? = false
Change "env-monitor" value as following operation:
ok setenv env-monitor enabled
env-monitor = enabled
```

Change "auto-boot?" value as following operation:

```
ok setenv diag-switch? true
diag-switch? = true
```

After these values changed, you can use "printenv" command to verify changes, and then use "reset-all" command to reset/store changes.

The following list is the output from a **.speed** command at the ok prompt on Solaria 650:

```
ok reset-all
Resetting ...
```

## 7.9 Basic OBP Command

### 7.9.1 test-all Command

Test all devices in the device tree; this operation is same as test-all command in the **obdiag** tool. The command can be used in ok prompt. The following list is the output from a **test-all** command at the ok prompt on Solaria 650:



If you need to use test-all command, the external Sun USB keyboard must be attached, otherwise, OBP cannot find USB device and will stop testing process.

```
ok test-all
Testing /pci@1f,0/pci@1,1/ATY,RageM1@2
```

Display not installed

```
Test hardware registers - passed Ok
Test RamDAC - passed Ok
Test Frame buffer - passed Ok
Testing /pci@1f,0/pci@1,1/ide@d
```

```
Testing /pci@1f,0/pci@1,1/pmu@3
Testing /pci@1f,0/pci@1,1/usb@c,3
Testing /pci@1f,0/pci@1,1/network@c,1
Testing /pci@1f,0/pci@1,1/ebus@c
Testing /pci@1f,0/pci@1,1/usb@c,3/device@3
Testing /pci@1f,0/pci@1,1/usb@c,3/keyboard@2
Testing /pci@1f,0/pci@1,1/usb@c,3/device@3/keyboard@0
Testing /pci@1f,0/pci@1,1/isa@7/serial@0,2e8
Testing /pci@1f,0/pci@1,1/isa@7/serial@0,3f8
[Used as Console]
Testing /pci@1f,0/pci@1,1/isa@7/dma@0,0/parallel@0,378
Testing /pci@1f,0/pci@1,1/isa@7/dma@0,0/floppy@0,3f0
Testing /pci@1f,0/pci@1,1/ebus@c/flashprom@10,800000
Testing /pci@1f,0/pci@1,1/ebus@c/flashprom@10,400000
Testing /pci@1f,0/pci@1,1/ebus@c/flashprom@10,0
```

---

### 7.9.2 probe-ide Command

Display the IDE device information; the following list is the output from a **probe-ide** command at the ok prompt on Solaria 650:

```
ok probe-ide
  Device 0 ( Primary Master )
        ATA Model: IBM-DJSA-220

  Device 1 ( Primary Slave )
        Not Present

  Device 2 ( Secondary Master )
        Removable ATAPI Model: ASUS    SDD-0824

  Device 3 ( Secondary Slave )
        Not Present
```

---

### 7.9.3 banner Command

Display the banner information of Solaria 650. The banner provides information contains:

- CPU type and frequency
- Firmware version
- Memory capacity



- Serial number
- Ethernet address
- HostID

The following list is the output from a **banner** command at the ok prompt on Solaria 650:

```
ok banner
```

```
SiGNAL Solaria 650 (UltraSPARC-III 650MHz), Keyboard Present  
OpenBoot 4.0.2.10 , 1024 MB memory installed, Serial #8388867.  
Ethernet address 0:2:11:80:1:3, Host ID: 80800103.
```

#### 7.9.4 .version Command

Display the Firmware information of Solaria 650. The following list is the output from a **.version** command at the ok prompt on Solaria 650:

```
ok .version
```

```
Firmware CORE Release 1.0.7 created 2001/6/6 22:28
```

```
Release 4.0.2 Version 10 created 2001/09/28 17:24 <---- OBP version 4.0.2
```

```
cPOST version 1.0.4 created 2001/4/27
```

```
CORE 1.0.7 2001/06/06 22:28
```

#### 7.9.5 .speed Command

Display the CPU/Memory/PCI bus frequency information of Solaria 650. The following list is the output from a **.speed** command at the ok prompt on Solaria 650:

```
ok .speed
```

```
CPU Speed : 650.00 MHz
```

```
Primary PCI : 66 Mhz
```

```
PCI Bus A : 33 MHz
```

```
PCI Bus B : 33 MHz
```

```
Memory Speed : 083.33 MHz ( CPU:SDRAM = 6:1 )
```

#### 7.9.6 Set-defaults Command

Restore default value for all OBP configurations. The following list is the output from a **set-defaults** command at the ok prompt on Solaria 650:

```
ok set-defaults
```

```
Setting NVRAM parameters to default values.
```

This chapter only introduces basic OBP command operation. For further more detail operation information about OBP command, you can find related documentation at Sun website: [docs.sun.com](http://docs.sun.com)



## 7.10 Device Tree

The command “**show-devs**” displays all the devices directly beneath the specified device in the device tree. The following list is the output from a **show-devs** command at the ok prompt on Solaria 650.

```
ok show-devs
/SUNW,UltraSPARC-IIi@0,0
/pci@1f,0
/virtual-memory
/memory@0,0
/aliases
/options
/openprom
/chosen
/packages
/pci@1f,0/pci@1
/pci@1f,0/pci@1,1
/pci@1f,0/pci@1,1/sound@8
/pci@1f,0/pci@1,1/ATY,RageM1@2
/pci@1f,0/pci@1,1/ide@d
/pci@1f,0/pci@1,1/pmu@3
/pci@1f,0/pci@1,1/usb@c,3
/pci@1f,0/pci@1,1/firewire@c,2
/pci@1f,0/pci@1,1/network@c,1
/pci@1f,0/pci@1,1/isa@7
/pci@1f,0/pci@1,1/ebus@c
/pci@1f,0/pci@1,1/ide@d/cdrom
/pci@1f,0/pci@1,1/ide@d/disk
/pci@1f,0/pci@1,1/pmu@3/watchdog@0,cc
/pci@1f,0/pci@1,1/pmu@3/beep@0,b2
/pci@1f,0/pci@1,1/pmu@3/ppm@0,b3
/pci@1f,0/pci@1,1/pmu@3/i2c@0,0
/pci@1f,0/pci@1,1/pmu@3/i2c@0,0/dimm@0,a2
```

```
/pci@1f,0/pci@1,1/pmu@3/i2c@0,0/dimm@0,a0
/pci@1f,0/pci@1,1/pmu@3/i2c@0,0/winbond@0,5a
/pci@1f,0/pci@1,1/usb@c,3/device@3
/pci@1f,0/pci@1,1/usb@c,3/keyboard@2
/pci@1f,0/pci@1,1/usb@c,3/device@3/mouse@1
/pci@1f,0/pci@1,1/usb@c,3/device@3/keyboard@0
/pci@1f,0/pci@1,1/isa@7/serial@0,2e8
/pci@1f,0/pci@1,1/isa@7/serial@0,3f8
/pci@1f,0/pci@1,1/isa@7/power@0,2000
/pci@1f,0/pci@1,1/isa@7/dma@0,0
/pci@1f,0/pci@1,1/isa@7/dma@0,0/parallel@0,378
/pci@1f,0/pci@1,1/isa@7/dma@0,0/floppy@0,3f0
/pci@1f,0/pci@1,1/ebus@c/flashprom@10,800000
/pci@1f,0/pci@1,1/ebus@c/flashprom@10,400000
/pci@1f,0/pci@1,1/ebus@c/idprom
/pci@1f,0/pci@1,1/ebus@c/eeprom@14,0
/pci@1f,0/pci@1,1/ebus@c/flashprom@10,0
/openprom/client-services
/packages/obdiag-menu
/packages/obdiag-lib
/packages/kbd-translator
/packages/dropins
/packages/SUNW,builtin-drivers
/packages/disk-label
/packages/obp-tftp
/packages/deblocker
/packages/terminal-emulator
```

## 7.11 Device Aliases

A device alias is a shorthand representation of a device path. Systems usually have predefined device aliases for the most commonly-used devices, so there is rarely a need to type a full device path name. The following list is the output from a **devalias** command at the ok prompt on Solaria 650:

```
ok devalias
screen                /pci@1f,0/pci@1,1/ATY,RageM1@2
mouse
/pci@1f,0/pci@1,1/usb@c,3/device@3/mouse@1
keyboard              /pci@1f,0/pci@1,1/usb@c,3/keyboard@2
userprom2
/pci@1f,0/pci@1,1/ebus@c/flashprom@10,800000
userprom1
/pci@1f,0/pci@1,1/ebus@c/flashprom@10,400000
dload                 /pci@1f,0/pci@1,1/network@c,1:,
net2                  /pci@1f,0/pci@1,1/network@5,1
net                   /pci@1f,0/pci@1,1/network@c,1
cdrom                 /pci@1f,0/pci@1,1/ide@d/cdrom@2,0:f
disk                  /pci@1f,0/pci@1,1/ide@d/disk@0,0
disk3                 /pci@1f,0/pci@1,1/ide@d/disk@3,0
disk2                 /pci@1f,0/pci@1,1/ide@d/disk@2,0
disk1                 /pci@1f,0/pci@1,1/ide@d/disk@1,0
disk0                 /pci@1f,0/pci@1,1/ide@d/disk@0,0
ide                   /pci@1f,0/pci@1,1/ide@d
floppy                /pci@1f,0/pci@1,1/isa@7/dma/floppy
ttyb                  /pci@1f,0/pci@1,1/isa@7/serial@0,2e8
ttya                  /pci@1f,0/pci@1,1/isa@7/serial@0,3f8
```



## ***Chapter 8 Solaris Diagnostics Tool-SunVTS***



### *SunVTS™*

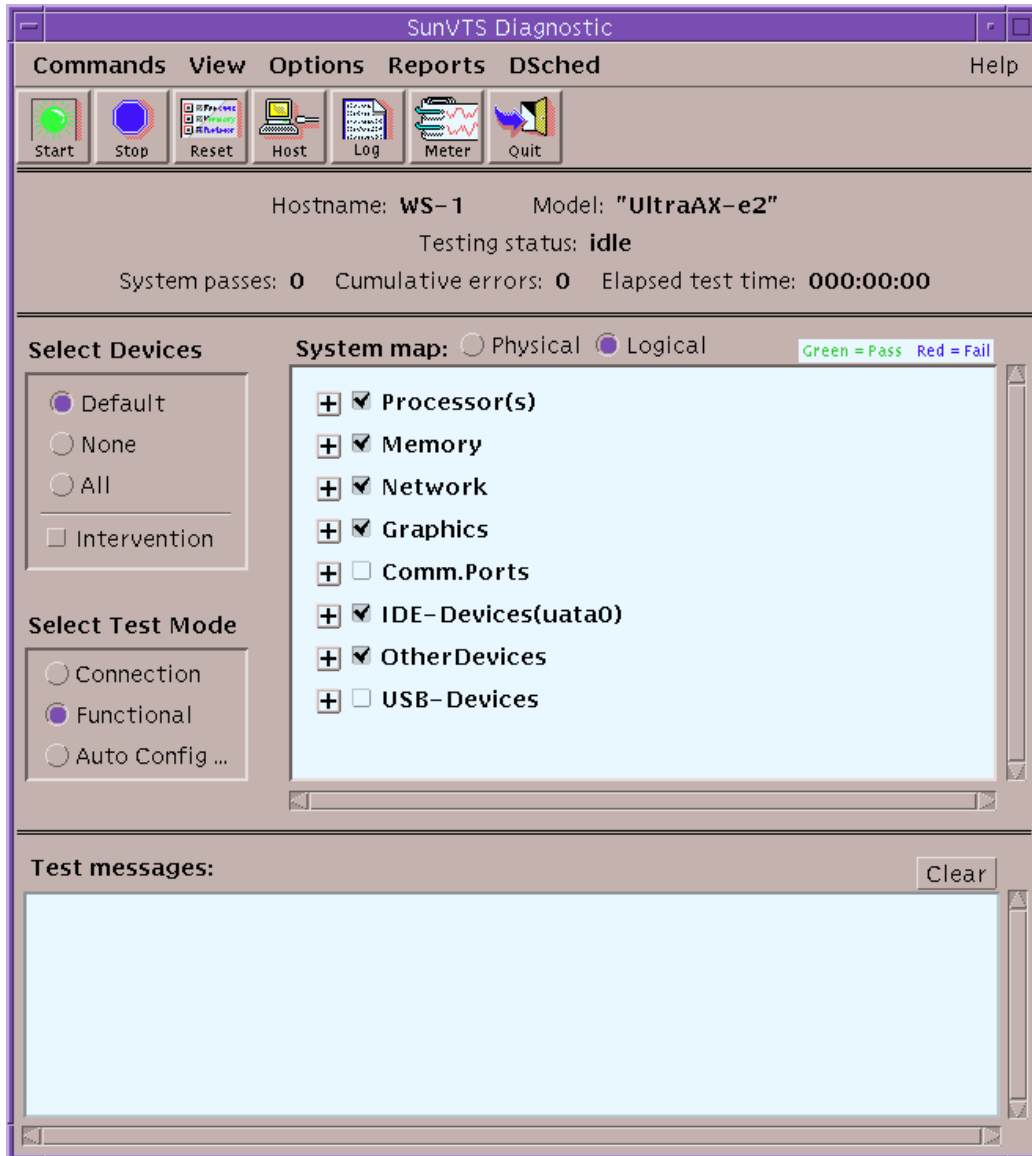
Sun Validation Test Suite (SunVTS™) is a comprehensive software package that tests and validates Solaria 650 by verifying the configuration and function of most hardware controllers and devices. SunVTS software is used to validate a system during development, production, inspection, troubleshooting, periodic maintenance and system or subsystem stressing. Refer to *SunVTS User's Guide* for detailed information on how to initiate and run SunVTS. Also refer to *SunVTS Test Reference* for further reference information.

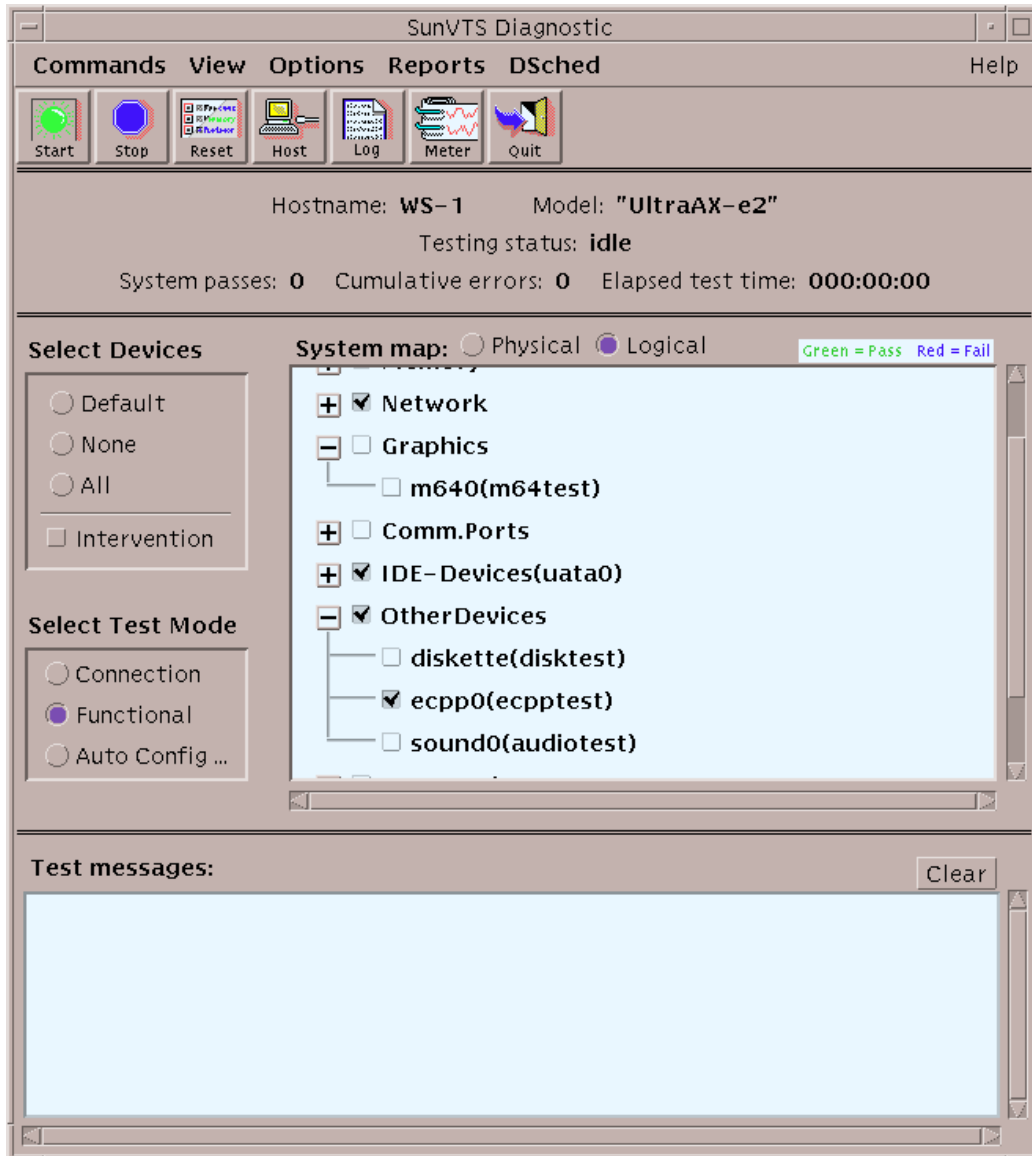
## **8.1 Starting SunVTS Software**

For security reasons only a superuser is permitted to run SunVTS software.

**The audio CODEC chip and VGA chip do not support the internal loopback test. The user should not select the audio/graphics test when running SunVTS tests.**







## **Chapter 9 Trouble Shooting Guideline & FAQs**



This chapter provides information for troubleshooting that may arise with your Solaria 650. It describes how to obtain technical assistance, provides a solution checklist, describes how to use the OpenBoot diagnostics software, and how to solve some common software problems.

### **Getting Help**

If you are unable to diagnose the problem yourself, you can obtain technical support from your distributor, reseller or from SiGNAL Customer Support.

Contacting SiGNAL Customer Support

Customer Support can be contacted by telephone or Email.

Telephone: (800) 228-8781

Email: [support@gosignal.com](mailto:support@gosignal.com)

In addition technical support information is provided on our website at the following URL: <http://www.gosignal.com>

Prepare problem description information before you call. This will assist us to find a solution to your problem as quickly as possible:

Machine model and serial number (from the base of the unit).

Machine configuration (what peripherals are connected).

For networking problems, a brief description of your network.

A description of the problem and any steps you have taken to solve it.

Any warning messages or output you have observed.

Any codes displayed in the status display.

## 9.1 Trouble Shooting Guideline

### ⊕ Startup Problems

No startup beep, main display is blank, status display is blank, green LED is not lit

Possible Cause	What to Check or Action to Take
The battery is not installed or is installed incorrectly.	Check the power system first. Check that the battery is correctly installed.
The battery is discharged. The AC adapter is faulty.	Plug-in AC adapter and power on system.  Contact your reseller to replace a new one.

Failed to boot operating system, main display OK, and status display OK

Possible Cause	What to Check or Action to Take
Hard drive is not appeared.	1. Use "probe-ide" command in the ok prompt to check primary hard drive status 2. Check the hard drive cable
Network configuration problem. This means your Solaria 650 is looking for a name server to which it has no connection.	Reset and restart your Solaria 650 as follows: 1. Press Power button. 2. When the OpenBoot welcome message is displayed, press FN-Stop-A. The OpenBoot ok prompt is displayed. 3. At the ok prompt, enter the following commands: ok boot -r

⊕ **Network Problems**

Unable to communicate over the network

Possible Cause	What to Check or Action to Take
Faulty transceiver or transceiver cable.	<p>Check basic Ethernet communication using the ping command. For example:  <code># ping systemname/IP address</code></p> <p>If the communications path is operating a message will be returned:  Systemname/IP address is alive</p> <p>The message will not display If there is hardware or configuration problem. If it's no response for a while, you may terminate it with the Ctrl-C interrupt command. If ping fails there may be a basic hardware or software configuration problem and you should check the hardware interfaces and the basic software setup.</p> <p>Ask for help from an experienced network administrator about specific configuration requirements for you location.</p>
Bad connection to Ethernet cable or un-terminated Ethernet cable.	
Entry for remote system not in local /etc/hosts or entry for your system not in remote /etc/hosts.	
Cannot find name server or name service configuration files or they contain incorrect information.	
Internet addresses incorrect or duplicated.	
No write permission to requested resources.	

## ⊕ **Hardware Problems**

### Display Problems

Possible Cause	What to Check or Action to Take
External display blank.	External display interface not enabled.
Garbled display.	Wrong display timing parameters set.

### I/O Problems

Possible Cause	What to Check or Action to Take
External keyboard or mouse does not work.	<p>Check that the external mouse or keyboard are compatible types and are connected to USB port properly.</p> <p>Check if the keyboard and Solaria 650 are communicating by using the command <code>kbconfig -r</code>. The keyboard LEDs should light.</p> <p>In the case of an optical mouse you can see if it is powered by checking to see if the red LED on the underside of the mouse is illuminated.</p>

## ⊕ **Software Problems**

The operating system controls the peripherals and is, therefore, a critical component in enabling the Solaria 650 to operate correctly. For example, a minor error in a network configuration file can completely prevent the network interface from operating.

This section provides some information on common software problems and gives brief advice about possible remedies in each case. By its very test it cannot be complete and situations may arise where you need the help of an experienced system administrator or SiGNAL Customer Support.

### Stopping Processes

To stop the processes, press the interrupt character Ctrl-C. This normally causes a program to exit. However, not all programs recognize or act on the interrupt in which case you need to kill the process in order to halt it, as described in the next section.

### Killing a Program

Before killing a process, you must know its process ID number (PID). To determine this, display a summary of all user processes with the



following command:

```
# ps -ef
```

Make a PID note of the program you wish to kill. For example, the following output shows a program called demo running with a PID of 7363:

PID	TTY	TIME	CMD
7361	pts/4	0:00	ps
7339	pts/4	0:00	sh
7363	pts/4	0:00	demo

To kill the demo process, you would type:

```
# kill -9 7363
```

The -9 specifies that the process should be killed regardless of what it is doing. If you do not own the process, you will need to become superuser to carry out this step.

### Operating System Panic

If there is any hardware or a software fault, the operating system may panic. This occurs when the operating system encounters a serious problem and it cannot continue to run the machine. If the system panics, a message will be printed on the screen: together with as much information as the operating system is able to gather about the cause. You should record the information for subsequent use by Customer Support. The system may reboot automatically reset due to this reason, as described below.

### Failing Program

Programs can fail to be executed for a variety of reasons, some conventional problem are as follows:

#### Corrupt program

The disk copy of the program has been corrupted.

#### Shared library inconsistency

The program was compiled with a shared library that is incompatible with the Solaria 650. Use the "ldd" utility to determine what libraries a program is loading. This problem can only be resolved by re-link the application with the shared libraries.

### Program Error

A programming fault can cause a segmentation violation if, for example, a program attempts to write to an illegal or protected address.

### Out of Swap Space or Memory Space

A message may displays on the console if each of the condition occurs.

If you are running OpenWindows, the server may suddenly exit, return to the terminal interface.

### Memory failure

There has been a memory error (hardware) during program execution. The Solaris™ operating system includes the trace utility that allows you to monitor the system calls made by a process. An experienced UNIX programmer may use to track down the cause of a problem.

In addition, experienced UNIX programmers may be able to use the crash, adb or dbx debugger utilities provided to determine the cause of a core dump.

### Warning Messages

The Solaris™ operating system often prints system information in the form of warnings. The warning message is only inform you some illegal operation may cause some problem, it will remind you to notice may something wrong with the file system.

Warning messages are generally displayed in the console window but may also be displayed in a command tool or application window.

Some messages may indicate that the system is out of resources and require attention. For example, a program may fail to start or may print a message such as:

out of swap space  
or out of memory  
or FS full on /dev/c0t0d0s6  
: cannot write %xyx

As a rule you should exit the offending program in this. It may be prudent to reboot the operating system after such an event because applications and the operating system do not always recover from resource failures gracefully.

If you run out of disk space you must either move files to a different filesystem, or to a networked server, or you must remove them.

## 9.2 FAQs

### ⊕ What is OBP?

A: OpenBoot is an industry standard (IEEE1275) ROM-based firmware implementation that controls your Solaria 650 between the time it is powered on and the Solaris™ operating system takes control. During this time OpenBoot carries out the hardware testing and initialization before booting the operating system.

OpenBoot also provides a user interface and programming language, based on Forth, which can be used to perform diagnostics and change user-configurable options stored in NVRAM.

### ⊕ How to display the OpenBoot User Interface?

A: Display the OpenBoot user interface as follows:

Press the power button to power on the system. When the OpenBoot start-up screen is displayed, press FN -Stop-A. The OpenBoot ok prompt is displayed.

### ⊕ How to check IDE devices configuration?

A: To check IDE devices configuration, enter the following command:

**ok probe -ide**

This command will display a list of IDE devices for your Solaria 650.

Device 0(Primary Master)	ATA Model: IBM -DJSA -220
Device 1(Primary Slave)	Not Present
Device 2(Secondary Master)	Removable ATAPI Model: TOSHIBA DVD-ROM SD-C2502
Device 3(Secondary Slave)	Not Present

### ⊕ How to check the Network Interface?

A: The following command allows to checking the status for Ethernet interface:

ok watch-net

gme register test -- succeeded.

Internal loopback test -- succeeded.

Link is – Using Onboard Transceiver – Link Up.

up

Using Onboard Transceiver – Link Up.

Looking for Ethernet packets.

'.' is a good packet. 'X' is a bad packet.

Type any key to stop.

.....

A series of periods (...) should be printed rapidly across the screen if the internal hardware and Ethernet connection are functioning correctly. If you are still having network problems, you should check your network configuration.

⊕ How to use TTYA to perform full system hardware self test?

A: Carrying out a full system self test with OpenBoot entails the following basic steps:

Connecting an ASCII terminal to the serial ports on the rear of Solaria 650.

Configuring OpenBoot to enable diagnostics and terminal I/O.

Entering the selftest command.

Connecting an ASCII terminal

The terminal should be configured for 9600 baud operation, 8 bits, no parity and no handshaking.

⊕ How to enabling Terminal I/O of Solaria 650?

A: Enter the following commands to configure OpenBoot to enable diagnostics. Use the serial channel as the input and output devices and to inhibit auto-booting:

setenv diag-switch? true

setenv output-device ttya

setenv input-device ttya

setenv auto-boot? false



**Note** – The last command will prevent your Solaria 650 from automatically booting the operating system when you power on (the normal mode of operation). You must reverse these commands, as described below, to re-enable normal start-up operation.

⊕ How to restore default settings for the NVRAM?

A: To re-enable normal operation, enter the following commands:

ok set-defaults

ok reset-all

⊕ What should I do if system cannot detect audio device?

A: 1. Reboot system with “-r”, “boot disk -r” in the ok prompt.

Use #sys-unconfig command to reconfigure whole system

⊕ How to update OBP?

A: Contact SiGNAL to obtain the OBP file. The OBP should be an executable script, double click it in the Solaris CDE. For CLI environment, use `#./Update.to.4.0.xxxxx` to update OBP.

⊕ How to adjust the network settings?

A: Use "sys-unconfig" command, it's the easiest way to reconfigure network settings.

⊕ How to adjust the graphics resolution and color depth?

A: Change directory to `/opt/NatWVGA`, execute the "setting.sh" script then select resolution and color depth. System will reboot automatically after settings.

⊕ Can Solaria 650 support Solaris 2.7?

A: Solaria 650 use sun4u platform and will support Solaris 8 and above version of Solaris.